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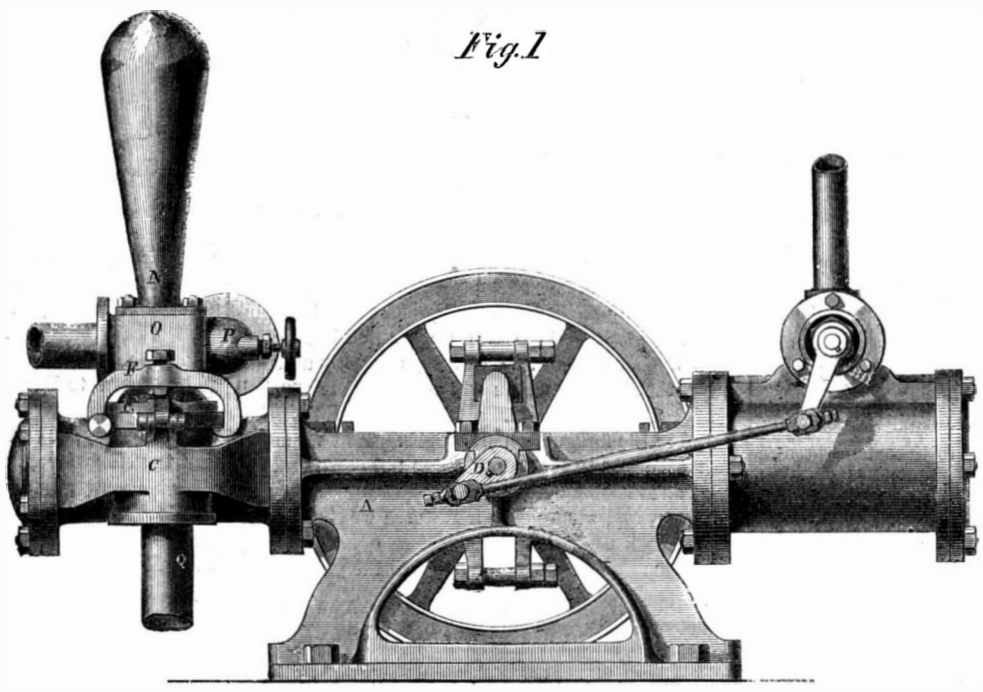
Improved Steam Pump.

The utility and convenience of a good steam pump is unquestionable; on ship-board, in the factory, work-shop and warehouse, they are indispensable. The prime virtues in a machine of this kind are that it shall be simple and yet efficient, not easily deranged and yet readily controlled by persons of moderate engineering capability; strength of parts and durability are also essential to economy. All of these qualities will be found in the pump herewith illustrated, and for convenience of access to the valve chamber of the pump, it is unrivalled. It is well known to engineers that this portion of a pump is oftener the cause of difficulty than any other, as when impure water is used, or where sticks or cotton-waste accidentally get drawn in when there is no strainer on the suction pipe, the valves become jammed or clogged, and will not work. This accident is likely to occur to any pump, and it is a very great point to have the valve chamber easy of access and in as few pieces as possible, so that no unnecessary delay may occur in examining and removing the cause of the derangement.

Fig. 1

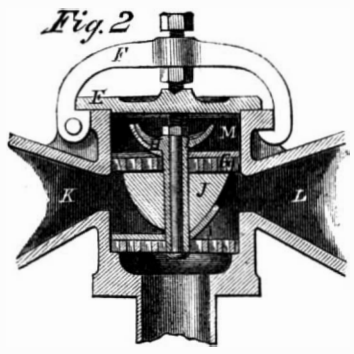


REYNOLDS & BABCOCK'S STEAM PUMP.

By referring to the engraving (Fig. 1) the reader will discover a side elevation of this pump, which so clearly explains the nature and arrangement of the machine that a detailed account is almost needless. It may be well to state, however, that the cast-iron bed-plate, A, unites the steam cylinder, B, and water cylinder, C, and is furnished with strong flanges to which these vessels are bolted. The steam cylinder has a peculiar oscillating valve attached to it which is worked by the crank, D, instead of an eccentric, and rotary motion is communicated to it and the fly-wheel by the well-known slotted-yoke. By the arrangement of the water valves, both induction and discharge, in one chamber, great facilities are afforded for the instantaneous removal of any foreign substance which may have lodged therein. In Fig. 2, the cross-section shows the arrangement of the parts. The section is taken through the water ways and chamber, and the reader will see that the bonnet, E, is held on by the clamp, F, one bolt sufficing to keep the bonnet down; by simply slacking this up and moving the clamp to one side it can be taken off and the valves examined. The perforated plate, G, is the valve seat, and H is the rubber valve, which strikes against a guard, I, so that it will not raise too high. The cone, J, below, also answers for a guard to the lower valves, and is so made that it does not interfere with the area of the water opening of the upper valves; K and L are the water-ways to the pump barrel, and M is the outlet to the air chamber, N. On the chest, O, there is a valve, P, which has a double seat and permits the water to be thrown out of either branch. The water enters the pump through the pipe, Q.

The following are some of the advantages which are justly claimed for these pumps:—They occupy less room than any other pump of the same capacity. The valves are arranged in one chamber, and in case they become choked, the four valves and their seats may all be removed, cleaned and replaced in two minutes' time, without removing a single nut or bolt from the machine. An automatic arrangement breaks the joint of the valve-chest bonnet, thus rendering the use of a cold-chisel and hammer unnecessary for that purpose. The nozzles and flanges are very convenient for piping in all situations. They make little noise, and from their simplicity of construction are not liable to get out of order, while every part is easily accessible for adjustment or repairs.

Fig. 2



This pump was patented on Dec. 15, 1863, by Reynolds and Babcock, of Mystic Bridge, Conn.; for further information address the manufacturers, Cottrell & Babcock, Westerly, R. I.

NEW LINE OF EUROPEAN STEAMERS.—A new line of steamers is to be put in operation between Havre and New York in April next. This line is the property of the "Compagnie Generale Transatlantique," and the service will be commenced with the steamers *Washington* and *Lafayette*, now building on the Clyde. These boats are of 900-horse power each, and are guaranteed by contract to be able to make 11½ knots per hour, winter and summer.

Anticipation of the Telegraph.

A lady recently pointed out to me (says a correspondent of the New York *Post*) a curious passage in the two hundred and forty-first number of the *Spectator*, dated in 1711, which is a remarkable foreshadowing of the electric telegraph. I transcribe it, as it may amuse as well as surprise many of your readers: "Strada, in one of his Prolusions (written about two hundred and forty years ago) gives an account of a chimerical correspondence between two friends, by the help of a certain loadstone, which had such virtue in it, that if it touched two several needles, when one of the needles so touched began to move, the other, though at ever so great a distance, moved at the same time and in the same manner. He tells us that two friends, being each of them possessed of one of these needles, made a kind of dial plate, inscribing it with the four and twenty letters in the same manner as the hours of the day are marked upon the ordinary dial plate. They then fixed one of these needles on each of these plates in such a manner that it could move round without impediment so as to touch any of the four and twenty letters. Upon separating from one another into distant countries, they agreed to withdraw themselves punctually into their closets at a certain hour of the day, and converse with one another by means of this, their invention. Accordingly, when they were some hundred miles asunder, each of them shut himself up in his closet at the time appointed, and immediately cast his eye upon his dial plate. If he had a mind to write anything to his friend, he directed his needle to every letter that formed the words which he had occasion for, making a little pause at the end of every word or sentence to avoid confusion. The friend in the meanwhile saw his own sympathetic needle moving about of itself to every letter which that of his correspondent pointed at. By this means they talked together across a whole continent; and conveyed their thoughts to one another in an instant, over cities or mountains, seas or deserts."

DRUNKENNESS.—An English office—the Accidental Death Insurance Company—declares that "there is one risk only which the company declines to insure, and that is the vague and uncertain risk of drunkenness. They will not insure the drunkard at any price, nor will they continue the insurance of any who fall into that state. The drunkard not only continually meets with accidents, but his constitution fails to repair an injury, and so renders his risk a burden upon the society."

BETWEEN Pembina (Minn.) and Crow Wing, a distance of three hundred and fifty miles, the United States mail is carried by dog trains. They have regular harness, fancifully ornamented, and are driven in tandem style, at the rate of from forty to fifty miles a day.

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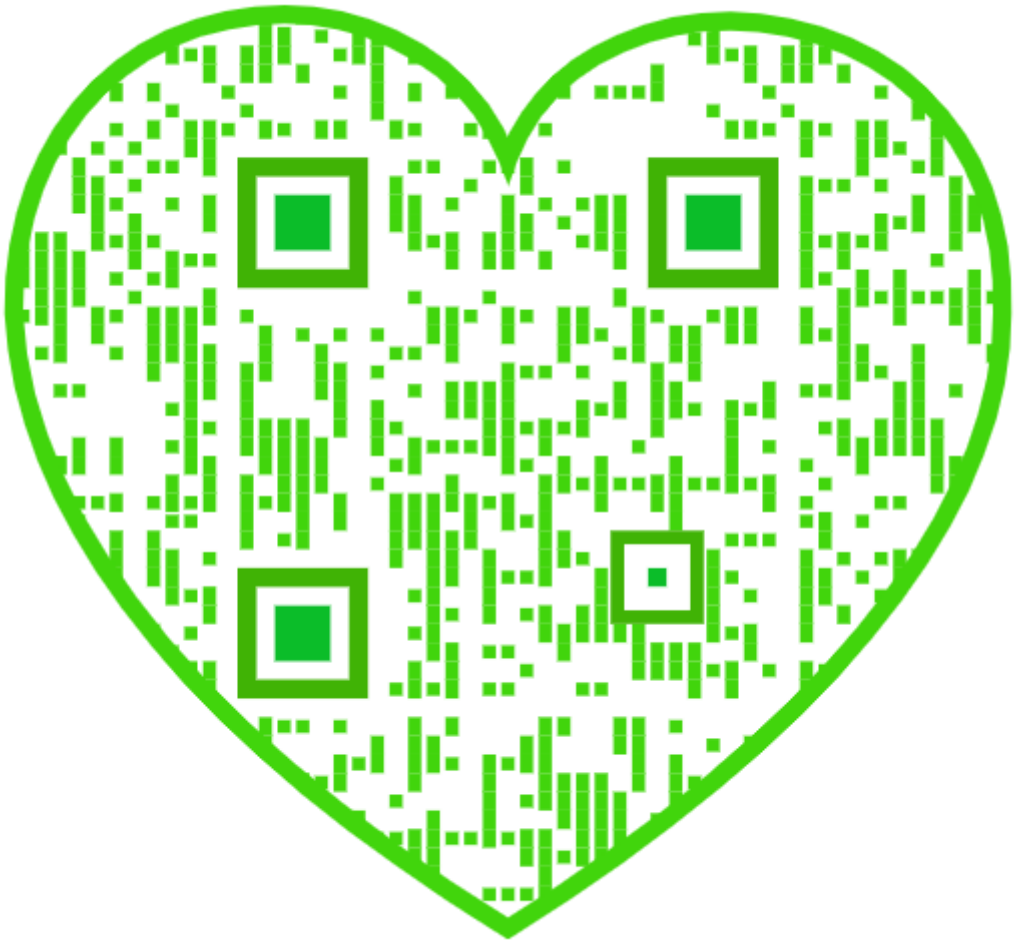

SOUTHERN NEWS.

We have received a file of the Wilmington (N. C.) *Journal* for the month of December, from which we glean some items of intelligence which may interest our readers. The sheets are almost illegible; the paper is thin, brown, and sleazy, the ink shows through, and the type is a type of the condition of the rebels—worn-out, but bold-faced still. Notwithstanding all these drawbacks, the editor advertises "good printing ink" in one corner of his paper, said advertisement averring that—

The quality of the INK will speak for itself by referring to the *Courier* and *Mercury* of this city, to either of which references are made.
Price FIFTY CENTS per pound, in packages to suit.
All orders must be accompanied by a description of Presses used.

J. LAWRENCE LEWIS,
Charleston Printing Ink Works,
King-street Road, Charleston.

The price of this delectable sheet is only $20 per year; but as the subscription is doubtless paid in Confederate money—paper for paper—it is cheap enough.

There is one remarkably suggestive item, which runs as follows; listen to the rebel editor:—

For any peculiar feebleness in our editorials to-day, the reader must hold the ink responsible. We are trying to write with some ink taken out of a bottle labelled "Superior English Black Writing Ink, manufactured by William B. Johnston, Columbia, S. C.," which we must say is a little the worst ink we ever did use. Some of this ink, or of ink so marked, has turned out good enough, but the last bottle is bad in the extreme. The label says every bottle is tried before packing. That before us could not have had justice done to it, else it would have been convicted, sentenced, and capitally executed.

Can it be that the "chivalry" are becoming reduced to cheating?—has the sensitive honor and pride of the "secesh" fallen so low that they adulterate ink? Let us hear no more of wooden nutmegs. And while the light emanating from the editor's brains is refused a proper medium to set itself before the world, the more apparent and not dissimilar illuminator—gas—is also depreciated, as witness, in proof, the following paragraph:—

BLOCKADE GAS.—Nearly all our Southern cities are now supplied with gas manufactured from pine, and it is an undeniable fact that it is equal to that manufactured from stone coal, if it is only manufactured as it ought to be.—*Charleston Courier.*

The editor of the Wilmington *Journal* says:—

We don't like to growl, but as we know that the gas here about one-third of the time is bad, we must come to the conclusion that it is not manufactured as it ought to be. The truth is that there is not enough made, and the consequence is that there is no adequate pressure.

Among all their troubles, however, the rebels find cause for congratulation in some fabricated paragraphs and letters, cut from Northern papers, run through our lines; these profess to show the state of feeling existing among our people upon the progress of the war, and also the condition of society. Here is an example of an item on the first-mentioned subject:—

VOLUNTEERS IN NEW YORK.—Speaking of the spirit of volunteering in New York city, a letter to the St. Louis *Republican* says:—
Not a cent of cash bounty is given to volunteers at any of the recruiting offices, and the inevitable consequence is that recruits are few and far between. Gen. Spinola and other officers who are authorized to recruit have been trying in vain to induce the authorities to offer sufficient bounties. In the meantime the precious days and weeks are rapidly slipping away, and the little State of New Jersey, by counting out its greenbacks liberally, is absorbing a large portion of our surplus and floating population. Of course this is not "as it should be," but there is no present probability of improvement.

As regards the "improvement" there may be some change of opinion before long, when the rebels see the new legions which are, even as we write, parading before our office to the music of fife and drum—men not torn from hearth and home by the merciless arm of the law, but freemen, keeping time to the music of the Union!

The fustian and hyperbole called "fine writing," which it has been the habit of Southern editors to indulge in, does not seem to have been eradicated by the war. Let the reader peruse this spasmodic effusion and see what he thinks of it:—

Who has the patriotism, the energy, the spirit to step forward and head this movement for the salvation of the country and the restoration of peace? Here is an opportunity such as occurs but once in ages to accomplish a great and sublime purpose which will carve the illustrious name of the leader in it upon the hearts of his countrymen, and make the world and history resound with his praises. Is there among millions of men whose fiery blood is of the South, no great genius who can mount above the common throng and arouse his countrymen with such electric eloquence as poured from the lips of Patrick Henry and called a nation to arms, or uttered by Peter the Hermit who marshalled an entire continent for the protection of the tomb of our Saviour?—*Mobile Advertiser and Register.*

We can answer the questions; from present appearances we should say—not any.

We transfer a valuable receipt to our columns, hoping that our enterprise will be appreciated by our readers. Every one can now indulge in "persimmon sirup," if they can only procure the p'simmons; this is the way to make this delectable mixture:—

PERSIMMON SIRUP.—Mr. S. W. Fulton informs us that he has made an excellent quality of sirup from persimmons. The process is quite simple, and the sirup is superior to the sorghum. Put the persimmons in a vessel and boil until the saccharine matter is fully dissolved, which can be told by the coagulation of the fruit; then strain, and boil the liquid to any desired consistency.

Here is another little advertisement which tells more than it reveals at a cursory glance:—

STRAYED, FROM MY LOT ON DOCK STREET, between 5th and 6th streets, about a week ago, a common size, mouse-colored, swayback, crumpled horn COW. $10 Reward will be paid for her delivery or for information that will lead to her recovery.

J. J. EVANS.

"A common-sized, mouse-colored, sway-back crumpled horn cow"—truly, a most valuable beast; beef must certainly be scarce in the Confederacy. And as a parting extract we give the following:—

BLADDERS! BLADDERS!—I WILL PAY FIFTY (50) cents for Beef and 25 for Hog Bladders. They must be well cleaned and kept blown up until perfectly dry, when they can be pressed together and sent to me by Express. When 25 or more are sent at a time, I will pay the freight.

R. B. SAUNDERS,
Chapel Hill, N. C.

It is doubtless the intention of this individual to collect enough of these articles to keep the Confederacy afloat a little longer. We fear, however, for the result; all the bladders in Christendom cannot sustain the sinking rebellion.

The absence of all social pleasures or advertisements relating to them is remarkable, and tells plainly of the gloom and despondency which has settled down upon the South. We hope, earnestly and sincerely, that but few weeks will elapse before we shall be able to write in a different strain from that embraced in the foregoing paragraphs. That we desire most earnestly to see the rebellion put down and the cause of it rooted out forever, is hardly necessary for us to say, and when peace is restored we shall be the last to recall the political dissensions of former days, or the party strifes which have led to the present unhappy differences.

Our sphere is the dissemination of useful knowledge—of practical information on all topics connected with the advancement of the best interests of the country; but we should feel ourselves lacking in the duty we owe the Government, as good citizens, if we failed to assert its eminence on all proper occasions and to discourage the enemies of it, whether at home or abroad.

Shot and Shell.

A correspondent of the Chicago *Journal*, who seems gifted with a philosophical spirit, thus treats of shot and shell:—

"Shell are queerly behaved things; often harmless against all probabilities, and, when you think they must be deadly, only patching thunder. If a shell passes you by only a few feet before it bursts, you are pretty sure to be good for the next one that comes, since each fragment takes away its share of the motion and flies. If a shell shows symptoms of 'making a landing' just in front of you, your best route would seem to be toward and past the shell; but how rapidly one could run in that direction, I have no means of knowing, having never seen the man that tried it. A solid shot is the most deceptive of projectiles. It may seem to move lazily, to be almost dead; but so long as it moves at all, beware of it! Just before the battle an artilleryman received his discharge for disability; but delaying, for some reason, his Northward journey, he was yet with his battery on the eve of the engagement; and, true to his instincts, took his old place beside the horse, and was just preparing to mount, when a solid shot came ricocheting across the field, bounded up and struck him in the lower part of the body. Crying out, 'I've got the first ticket, boys!' he sank down and only added, with that strange dread of a little hurt a terribly wounded man always seems to feel, 'lay me down by a tree where they won't run over me.' They complied with his request, hastened into position, and saw him no more. The poor fellow's discharge was confirmed by heaven. Now, that fatal ball, when having finished its work there, leaped lazily on, pushed out the skirt of the artillerist's coat, as a hand would move a curtain, without rending it!"

Indolence and Industry.

A little indolence, a brief vacuity of thought, may enervate the mind for the labor of a whole day. If you feel its poppy influences spreading over you, start up and shake yourself. Be intent about something, however trivial it may seem, and the insidious languor will soon pass away. John Leech, in one of his sketches, has well illustrated the distinction between croaking idleness and self-contented activity. Two young men have gone out to spend their annual holiday in fishing. The rain begins to pour down in torrents. One of them throws aside his rod, but the other continues to fish with stern determination. "Do come home," says the croaker. "Well," says the happy fellow, "I never see such a precious disagreeable old chap; you come out for a day's pleasure, and you are always for going home." Of course, the rain was far from pleasant, but he knew that a day of enforced idleness was still worse, and clung to his rod as a protection against *ennui* and discontent. He knew the value of the words of the wise man—"Whatsoever thy hand findeth to do, do it with all thy might;" he had come out to fish, and fish he would, though a waterspout should burst upon his head. We should all act on the same principle, and many of the clouds of life will be dissipated; the lion in the path will be found to be only a jackass; the mind once set in motion will find happiness in the play of its own faculties, and be proof against the corroding cares of life. No matter what the employment may be so long as it is innocent; read, think, write, fish, shoot, paint, farm; go down in a diving bell or up in a balloon; do anything you choose; but above all things, never be idle, or you will soon become a croaker. We were traveling the other day with a gentleman who had made a large fortune in one of the colonies and returned to England to enjoy it. It is the manner of our countrymen, Froissart tells us, to take their pleasure sadly; it certainly was so in this case. He was traveling for pleasure, but pleasure seemed to elude his grasp; like the old man in Rogers' poem, "he looked for something, he knew not what," and seemed grievously disappointed at not finding it. With all his wealth he was a man to be pitied; he felt so himself; the change from active employment to listless idleness had embittered his mind. "I have nothing to do," he said, "but to spend my money, and I had far more pleasure in making it." Of course he had, because the making of it elicited all his powers and gave a healthy tone to his mind, which became morbid when it had no longer anything to occupy it. The spending of money conferred no pleasure, because he felt no interest in the objects on which it was spent.—*English Paper.*

An Asphaltum Lead near Buena Vista Lake.

The Mariposa *Free Press* says:—"An extensive deposit of asphaltum, and numerous springs furnishing the substance, have been discovered by Stephen Bond of Bear Valley, near Buena Vista Lake. The locality was first found in June last, by Mr. Bond, while on a prospecting tour. It is situated about 18 miles from the lake, on the San Luis Obispo trail, and the bituminious region so far as explored is some eight miles in extent. As it boils up on the surface its temperature is warm and it is of about the consistency of molasses, but cools and hardens by exposure to the air. Rats, mice and birds become entangled on its surface, while it is in a semi-liquid state, and, being unable to extricate themselves, perish. Hundreds of them in all stages of decomposition are found on the asphaltum beds. Mr. Bond brought some specimens of the substance with him, and by experiment it is found to be of a superior quality for the manufacture of coal oil or kerosene, which is prepared by a process of distillation. Its locality—so far from easy means of transportation—renders its value doubtful."

ATTERBURY & REDDICK'S LANTERN.—The reflector lantern of Messrs. Atterbury & Reddick, illustrated on page 56, present volume, was erroneously described as having the reflector exposed to the heat and flame of the lamp. The reflector is set outside of the lantern and is not liable to injury from the causes mentioned.

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MISCELLANEOUS SUMMARY.

PUBLISHER'S CARD.—PART OF AN EDITION OF THE "SCIENTIFIC AMERICAN" DESTROYED BY FIRE.—By one of those unavoidable casualties which occasionally occur, the Western mails, containing No. 1 of the new volume (X) of the SCIENTIFIC AMERICAN, were destroyed in their transit by the burning of a mail car, which accident resulted in the utter loss of that portion of our edition which was forwarded to our Western subscribers. We are daily receiving letters from news-agents and office subscribers requesting us to supply the missing number. We should be most happy to supply all these orders if it was in our power; but we have already furnished duplicate copies of this number until our "reserve" edition is nearly exhausted. We are not aware, yet, how many copies are needed to supply all who have been deprived of their number 1; but if agents and others who are in great need of the missing number will write and inform us the quantity they wish, and it amounts to enough to warrant us in incurring the expense of reprinting the lost number, we will attend to having it re-published. The trouble and cost will be very considerable to us; and unless several thousand copies are required, it will not be expedient for us to incur that expense.

TO MAKE BEER IN SMALL QUANTITIES.—We copy the following formula from the *Année Pharmaceutique*:—"Infuse 5 ounces of hops, 1 ounce of juniper berries, and half an ounce of elder flowers in sufficient boiling water to make 9 gallons of strained infusion, to which add 2 pounds of sugar and 7 ounces of gum (or dextrine); dissolve by stirring; let cool to about 80°, and then mix with one ounce of brewers' yeast, and fill into a (quarter) keg; leave it for a day in a medium temperature, with the bung hole loosely covered. After 15 hours more it must be bottled, and becomes fit to drink after a week. The juniper berries as well as the elder flowers may be omitted to suit different tastes."

THE DATE.—There is no fruit that can be eaten so constantly, or with so much impunity, as the date. It is like bread, and is bread to whole nations of orientals, And what a delicious bread, baked by the sun, and showered in profusion upon the earth, to be gathered and laid up for the future, either dry or in huge corbels, or pressed into a conserve, which, when cut into slices, looks and eats like plum pudding. Immense quantities of this conserve are exported from Egypt and Arabia into all the neighboring countries, where it is much prized, especially in the harems, where the women and children may almost be said to eat it incessantly.

RETURN OF A BRILLIANT COMET.—A supplement to the January number of the *American Journal of Science and Arts* contains a letter from Mr. James C. Watson, of the Observatory of Ann Arbor, Mich., in which he states that he discovered a new comet on the 9th inst.; that it is large and bright, with a tail 1½° in length, and a nucleus strongly condensed at the center. He believes it is a return of the bright comet that appeared in 1810, during the wars with Napoleon, and which so astonished Europe.

SUDDEN DEATH OF AN ENGINEER.—After the late severe snow-storm at the West, an engineer of a train upon the Racine and Mississippi Railroad, while attempting to force his train through a huge snow bank, was drawn from the cab of the engine into the bank and buried in the snow some seven or eight feet. When his disappearance was discovered, search was made and his body recovered, but life was extinct. He died from suffocation.

A MONSTER CAKE.—The largest cake ever made in the world is now on view at the shop of Mr. Arnatt, confectioner, St. Giles's, in London. It weighs 3,000 pounds, stands seven feet high, and is 18 feet in circumference. There have been used in its manufacture 550 pounds of flour, 3,000 eggs, five barrels of currants, two cwt. of oranges and lemon peel, 300 pounds of butter, 400 pounds of sugar, besides other ingredients.

A chap at the South proposes to launch into the upper regions what he calls a "Bird of Art," or flying machine, with which he intends to cruise about, above common range, and drop shells into Yankee camps and ships. Who will invent an iron-clad hat?

HOW TO MAKE YELLOW BUTTER IN WINTER.—A cow must have a good supply of good hay, that has been made of good grass, cut before the blossom has fallen, and cured properly without having been wet while it was being cured. A few orange carrots daily—not reduced to a fine pulp and mingled with butter—but fed to the cow in connection with a few pounds of Indian meal, made of yellow corn. A good supply of good cornstalks—not those that have been frost-bitten and weather beaten. A good cow, with yellow skin about the udder is very essential. A cow in good condition—not one as poor as "povertyation." A good stable well littered, and an abundance of clean water for the cow to drink. Never allow the milk to freeze. With these essentials it is possible (says a writer in the *Country Gentleman*) to have good yellow butter in winter.

COFFEE AND TEA CULTURE IN CALIFORNIA.—The cultivation of coffee and tea promises to become an important business in California. One nursery at Sacramento has five thousand coffee plants on trial, and it is believed that there will be no difficulty in bringing up the plant to a standard of hardiness to weather the mild winter of that climate. Near the Mission Dolores several thousand tea-plants have been raised during the last year. The tea-plant is grown in China and Japan very extensively, in latitudes corresponding to California, and the San Francisco journals think there can be little doubt that it will be cultivated hereafter, for household purposes at least, on every farm in that State.

SORGHUM SUGAR.—The Washington *Republican* says:—"An experiment was made in the Department of Agriculture a day or two since, before a large number of persons, clearly demonstrating the practicability of every man in the North making his own sugar. A gentleman from Nebraska, Mr. J. F. Riggs, who is about taking out a patent for his process, was the operator. From sorghum sirup, sent to the department for exhibition, in the course of a few moments he produced a clean and pure sugar, equal in all respects to the best coffee sugar, the residue of the sirup proving to be an excellently-flavored article, strongly resembling amber or golden sirup of the shops, and entirely free from sorghum taste."

EREMACAUSIS.—Organic substances, deprived of their normal life principle, decay when exposed to the atmosphere. The oxygen which is in the air unites chemically with these substances and produces a change, which used to be called putrefaction, but to which chemists have now given the learned name of *eremacausis*. The process of putrefaction consists in the elements re-arranging themselves, so as to become more degraded. The flesh of an animal undergoing putrescence continually changes, and gradually assumes more simple forms of carbonic acid, water and ammonia; and these pass into the atmosphere in a volatile state.

THE projectile of Sir Wm. Armstrong's new rifled 600-pounder is made of steel, and has no band of soft metal at the base, if the illustration in the London *News* is correct. The shot is made to take the grooves in the gun by inserting a number of brass pins in the body of the shot. These pins project but a short distance and are round; as the impulse is given to the projectile they follow the grooves, in a manner readily understood by mechanics. This plan does not work very well, if a recent paragraph in an English paper is correct, which, in terms more terse than elegant, says: "The brass buttons in the monster's feed disagreed with him."

GUN-PORTS OF THE ENGLISH IRON-CLADS.—A noticeable feature in the new English iron-clad *Minotaur* is the construction of the gun-ports. The ship is a broadside vessel, and instead of having square ports as usual, has long, narrow ones, which permit elevation and depression of the guns, but no lateral range. This strikes us as an improvement, as the chances of smashing gun carriages, killing the crew, and damaging the ship are much lessened.

CHICAGO LUMBER MARKET.—The total receipts of lumber by lake at Chicago, during the year 1863, were 393,074,882 feet. These are large in excess of the receipts of the year before, and do not include the receipts by railroad, which were considerable. The Chicago *Journal* says the past has been the most prosperous lumber season ever known in the West, and the prices have been higher also than ever before.

PORK PACKING IN THE WEST.—According to the figures of the Cincinnati *Price Current*, the whole number of hogs packed up to the 6th ult., in the West, is 1,982,659, against 3,168,559 last year. The entire estimated number for this year is 2,254,897. The deficiency will not fall short, according to these figures, of 900,000 hogs. It is now clear that the hogs this season will be the lightest ever prepared before, and the yield of lard per hog far less than any season upon record. The deficiency so far is about thirty per cent. in the number, and in weight about ten per cent.

THE great families of Russia have conceived rather a pretty idea, which has become the Muscovite mode, that is, to present visitors to their country residences, as a souvenir of their sojourn, an album which contains a photographic illustration of the happy days they spent—photographs of the personages who formed the society, of the mansion, the sights and scenes, the stables, the horses, the principal episodes and events during the aristocratic *vileggiatura*.

THE CINCINNATI COAL FAMINE.—A bill has been introduced in the Ohio Legislature, empowering the authorities of Cincinnati to levy a tax not to exceed one mill, for three years to come, for the purpose of buying and storing several million bushels of coal, to prevent the recurrence of the coal famine from which the population is now suffering. The bill is made applicable to other cities having 100,000 inhabitants.

THE CHICAGO PROVISION TRADE.—The Chicago *Tribune* of Jan. 15th says that the previous day was probably the busiest day the city ever saw in the provision market. In bulk and box meats alone no less than four million pounds changed hands, besides several thousand packages of pork, lard, &c.

IN New Zealand the English employ blood-hounds to hunt the Maories, and they are about to use a steam engine to throw scalding water on the "savages." As is universally known, the English always demand that war shall be humanely waged—by their enemies, and by other people generally.

CALIFORNIA raisins are the greatest novelty. They are equal to the best imported and don't cost as much. Very few have appeared in the Atlantic States, but in course of time they will drive the foreign fruit from the market.

COSTLY PAINTING.—A contract has been entered into for a painting to cost $40,000, to be placed in the "eye of the dome" of the Capitol, so far above the spectators that some of the female figures introduced will be sixteen feet high.

A BOSTON paper thinks it suggestive that the British merchant in whose name the pirate *Florida* cleared at the English Custom House is an extensive dealer in *brimstone*.

THE original old printing press used by Benjamin Franklin in Boston, nearly a century and a half ago, arrived there recently. It was presented by J. B. Murray, Esq., of this city.

Business Failures during the Year 1863.

We give below a statement of the amount of business failures during the year 1863, as compared with 1862, in the cities of Philadelphia, New York, Brooklyn, Boston, and the whole of the Northern States, together with the British Provinces. It will be seen that the amount for the year 1862 exceeds that of 1863 by nearly $16,000,000. This is accounted for chiefly by the check given to speculation, the heavy rise in the prices of goods, and the disposition shown by merchants, in view of the uncertain prospect the future presented, to profit by the opportunities afforded, and place themselves in shape to meet any emergency. The number of failures have diminished in uniform ratio throughout the Northern and Western States.

	1862.	1863.
New York City and Brooklyn	$7,491,000	$2,035,000
Philadelphia	1,310,000	442,000
Boston	2,013,000	1,138,000
Balance of Northern States	12,235,300	4,289,000
British Provinces	3,292,588	2,563,000
Total Northern States and British Provinces	$26,341,888	$10,467,000

The list of failures embraces those only in the legitimate line of trade, and does not include speculators in gold, stocks, produce, &c. Business seems to be in a healthy condition, as credits are much shorter than formerly, and there are more cash transactions.

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SUBMARINE WARFARE.

The following extremely interesting article is cut from the *London Review*, and will fully repay attentive perusal:—

Few things in the present American conflict have been so much spoken of, and have produced such small results as the much-dreaded "torpedoes." One, several weeks ago, was exploded in Charleston harbor, under the bows of the *Ironsides*, raising a wave which swept her deck, and extinguished the engine fires, but without injuring the hull. Another, early in the present year, exploded under a transport in the Yazoo river, and destroyed her. But though the Confederate coast, harbors and rivers have been described as thickly planted with these agencies of destruction, and many enterprises have been abandoned by the Federals out of sheer terror of encountering this unknown danger, these are almost the sole instances in which any practical result has been effected. This indeed was admitted by Captain Maury in the course of the discussions at the late meeting of the British Association. Our own experience in this species of warfare is somewhat similar. We have never indeed, attempted stationary explosive vessels, for the sufficient reason that we are not in the habit of standing merely on the defensive, the only situation in which they would be serviceable. But when we sought to attack the French flotilla at Boulogne by means of catamarans, as they were called—vessels about 21 feet long by 3 wide, filled with 40 barrels of gunpowder, loaded till they just floated level with the surface, and fitted with clockwork to cause the explosion any given number of minutes after being cut adrift and sent with the tide among the enemy's vessels—only one proved effective, the rest blew up harmlessly in the midst of the hostile fleet. So when, a short time before, Lord Cochrane prepared in the Aix roads five "explosion vessels," filled with 1,500 pounds of gunpowder, and strewn over with thousands of shells and grenades, only one performed its work properly, though in that single case the violence of the shock was so great that it broke into fragments the massive boom which guarded the harbor, and drove the French in terror from their ships, while the wave it raised almost swamped the gallant author of the device in the small boat in which the crew were pulling for their lives from the vessel after the fuse had been lighted. Perhaps, therefore, even in the case of a war with Russia, we need not feel any very great alarm at the new defences with which Cronstadt is being surrounded, which consist, according to the last advices, of numberless torpedoes, each containing 70 pounds of powder, sunk in the channel; and of a mysterious submarine boat, composed of 200 tuns of iron and steel, which is to attack our ships in that part which in them, as in the human subject, is least capable of defence.

The Confederate devices differ from these antiquated arrangements in other respects beside the fact of their being stationary. Our explosion vessels and cata marans were intended to explode on the surface, or immediately under it, and at a fixed period after being fired; while theirs are submerged, and intended to explode on being touched by the hostile ship. But whether it is that the machinery for this purpose is too delicate, and becomes easily deranged, or that the body of water between the shock and its object deadens the effect, the result seems singularly ineffective. A new agent, however, is likely to be soon introduced which may modify this result. It has been ascertained that gun cotton, properly prepared, will act with immense violence through a distance of several feet of water. It possesses a quality which can be given to gunpowder only in a very limited degree, of having its rapidity of inflammation and consequent mode of action very easily modified to suit the special purpose for which it is designed. It may be made either to explode slowly, and, as it were, progressively, or instantaneously. Now this difference produces very different results. A slow explosion is best fitted to lift heavy masses, as in mining, or used in large guns; a rapid one is most effective in shattering in the immediate neighborhood. Thus several ounces of gunpowder may be fired upon a porcelain plate without injuring it, but a single drop of nitrogen will grind it into minute fragments. Gunpowder, indeed, when used in large quantities, even in the open air, will destroy what it touches, for the *inertia* of the large body of air which must be moved by the liberated gases drives their effect in part against the more solid obstacles in the neighborhood. Thus the gate of a fortress may be blown in, as that of Delhi was, by the explosion of a bag of gunpowder nailed against it. And no doubt if such a bag could be brought immediately against a ship's side, it would be as easily stove in. But the interposition of the water supplies a buffer; the explosion has rather the effect of strong and sudden pressure than of a blow; its effect is not so rapid but that the water can move partly out of the way, and in communicating to it this motion, the power of the gunpowder is lost. Gun cotton, however, when specially prepared and confined in a box, explodes with an instantaneous action, almost equal to that of chloride of nitrogen; the water has not time to move away, and the blow is thus transmitted sharply, as by an iron striking one end of an iron rod. So it is possible that this new explosive material may render "torpedoes" hereafter a little more lively and active than they have yet been.

Meantime, however, some experiments conducted last year by the officers of the *Excellent*, at Portsmouth, which have just been published in the Appendix to the Report of the Ordnance Committee, open a new field for speculation. It is well known that if a gun be fired while its muzzle is a few inches under water, it will burst, the reason being that the impetus acquired by the gases is brought to a sudden check by the resistance of the water, and before the water can move away the blow has burst the piece. But if the gun were wholly submerged, this reason would not hold, for there would then be no sudden check, and the immobility of the water would be gradually overcome while the combustion of the powder proceeds, having much the same effect as double or treble shotting the gun. The proposal has, therefore, often been made that we should try the effect of a gun thus fired under water, but it has not till now, so far as we know, been put to decisive proof. The experiments at Portsmouth were conducted in this manner. A stage was erected in the harbor within the tide-mark; on this an Armstrong 110-pounder was mounted, loaded and aimed, at low water, at a target placed also within the rise of the tide. When both gun and target were covered by the water to a depth of 6 feet, the gun was fired by means of a tube. The targets were placed at from 20 to 25 feet from the muzzle of the gun. One was composed of piles and oak planking, of a thickness of 21 inches; another consisted of the hull of an old vessel, the *Griper*, laid on a mudbank; a third was made up of 3 inches in thickness of iron boiler plates, bolted together, and packed with timber. On all these the effect of shot and shell from the submerged gun was very startling. The wooden target was pierced through and through; the iron target was broken into pieces and driven into the packing, the solid shot passed right through both sides of the vessel, making a huge hole through which the water poured in torrents; a shell with percussion fuse burst in entering, opening a chasm of 5 feet by 3 in the planking, shattering the ribs, and bursting up the deck beams above.

It is impossible to foresee the full consequences of these most important experiments in the naval war and ship-building of the future. But that they must be very material is beyond a question, if we only remember that hitherto we have been content to cover with armor only the portion of our vessels which is above the water line, or a few feet under it, in the belief that no shot could take effect lower than "between wind and water." This, no doubt, was the case both with the old spherical shot, and the Armstrong conical shot, for both ricochetted when they touched the surface of the water. Mr. Whitworth's flat-fronted shells and shot certainly enter the water, and are effective after passing through it for some 20 feet, but as their form causes them speedily to lose velocity, and as, if fired from the surface, they must pass obliquely through a considerable distance before attaining any great depth, they are not likely to prove very dangerous at more than a few feet in depth below the water line. But the new submarine firing may obviously be equally effective at 10 or 20 feet as at 6 feet under water, and consequently the whole hull must be armored to resist it. What thickness of armor may be requisite for this purpose is yet to be determined. But any armor, even the thinnest, involves a great addition to the weight of the vessel, and must very seriously effect all questions regarding their size and form. And, indeed, it may well be doubted whether we shall be able to build any vessel, with stowage capacity, which shall be able to bear this additional weight. Certainly, at once, we may consider all ships with mere wooden hulls, like the *Royal Oak*, or those new vessels which Lord Palmerston insists on our laying down in order to use up the dockyard store of timber, and which Mr. Reed is accordingly now designing, as placed *hors de combat* by the last novelty in the art of gunnery.

It will have been seen that we do not anticipate any serious difficulty in the way of its practical application. Our mechanics, and those of other nations, are quite ingenious enough speedily to devise for self-opening and self-closing submarine ports, from which a gun may send its contents into its opponent's hull. For harbor defences, guns placed permanently below water in the channel, and fired by a galvanic battery on shore, when the hostile ships are overhead, are an obvious method of applying the principle, and probably would be far more effacious than any self-acting torpedoes. But even without any mechanical appliance, is it impossible for sailors to sling a heavy gun, ready loaded, overboard, and fire it by a tube or wire as they run alongside the enemy? Innumerable questions of this character will rise from these preliminary Portsmouth experiments. But while waiting for their development and solution, it cannot at least be denied that the discovery of means by which the old peril of a shot between wind and water is converted into the peril of a yawning chasm made three fathoms below the surface; while the later application of horizontal shell firing, directed against the hulls beneath, opens up a new epoch in the science and art of naval warfare.

Two Great British Armor-Clads.

During the third week of December last, the *Hector* and the *Achilles*, two great plated frigates, were launched in England. The *Hector's* tunnage, builder's measurement, is 4,123 tuns, but it is in reality 6,400 tuns; she draws 19 feet 8 inches in water; her armor consists of iron plates 4½ inches thick, fixed on a teak layer 8 inches thick, sheathed on the back with ¾-inch iron plates, resting upon an inner backing of 10-inch teak; being a thickness of 23¼ feet. She carries twenty-four 68-pounder smooth-bores, and six 110-pounder rifled Armstrong's on her fighting deck. On her upper deck she has four 110-pounder rifled Armstrongs, which can be used broadside, or bow and stern; also two 20-pounder rifled Armstrongs; one 9-pounder rifled Armstrong; one 12-pounder ditto field-piece, and one 6-pounder brass smooth-bore, for boat and shore service, She is also fitted to act as a ram, and has nine water-tight compartments. She was built for speed also, but in this she is a failure. The utmost that could be screwed out of her on trial was 12 knots, her main speed being 11·448 knots (13 miles), in making which she buried her nose in the water. Her ventilation was found to be "fearfully faulty," the temperature being rendered very cold everywhere, except in the stokers' compartment, where it was 130 degrees. The *Achilles* is 6,080 tuns; she draws 20 feet of water; her armor-plates are of rolled iron, 4½ inches thick, tapering to a minimum thickness of 2½ inches, with a teak backing of 18 inches. She has armor bulkheads, to prevent the ship from being raked fore and aft, and it is proposed to put a rifle tower on her upper deck. She is pierced to carry 46 guns on her main deck, with four Armstrong pivot-guns fore and aft on her weather deck. Her port sills are embrasured, giving each gun a play of 90 degrees. She is far superior to the *Hector* in sailing qualities, and can do 16 miles (14 knots) an hour without difficulty. More speed can be got out of her if necessary.

THROWING OLD SHOES.—The officers of a Massachusetts regiment, which recently encountered the rebels in the Shenandoah Valley, were much surprised at the peculiar noise made by the enemy's cannon. Upon investigation it was ascertained that the rebels had not fired either shot or shell, but had used instead pieces of railroad iron, and old horseshoes fastened together with telegraph wire.

IT is the law in Japan that no fir or cypress tree can be cut down without the permission of a magistrate, and for every full-grown tree that is felled a sapling must be planted.

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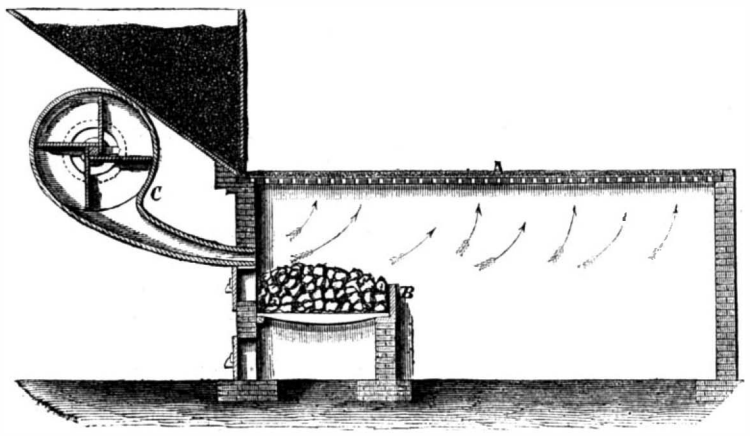
Improved Hot Blast Grain Dryer.

This engraving represents another method of drying grain, differing in some respects from the plans of the inventor, Mr. S. Marsh, before published on page 49, present volume of the SCIENTIFIC AMERICAN.

This arrangement consists in spreading grain in thin layers on a horizontal perforated metallic table, A, said table being placed over a furnace, B, the hot air from which is driven upward through the grain by the blower, C. This furnace may be dispensed with where a steam engine is employed, as the heated air from the boiler furnace may be caused to pass directly under the table and so impart its caloric to the damp grain. The hopper, D, contains a supply of grain, which, as fast as that upon the table is removed falls down, and may be spread out to dry with but little trouble.

As an expeditious and simple method for effecting the object, this plan is certainly an excellent one, as the large heating surface derived from the great area of the table permits the moisture to be driven off rapidly. The invention was patented on Jan. 16, 1863, by Sylvester Marsh. For further information address the inventor at Box 3047, New York city.



MARSH'S HOT BLAST GRAIN DRYER.

Henry Cort, Inventor of Iron Puddling.

The following interesting sketch of Henry Cort is taken from Smiles's "Lives of the Iron-workers and Tool-makers":—

Henry Cort was the great systematizer of the iron manufacture. He relinquished his business as a navy agent about the year 1775, and took the lease of certain premises at Fontley, near Fareham, at the northwest corner of Portsmouth Harbor, where he erected a forge and iron mill. The improvements embodied in his two patents of 1783 and 1784 were of a most important character. In the first patent he describes his method of making iron for "large uses," such as shanks, arms and palms of anchors, by piling and faggoting; that is to say, by welding together bars of iron of suitable length, forged on purpose, and tapering so as to be thinner at one end than the other. These bars were laid over one another like bricks in a building; the faggots so prepared were put into a common air or balling furnace, and when at a welding heat they were brought under a forge hammer of great size and weight, and forged into a solid mass of iron. He also notices the process of working the faggots by passing them through rollers, which was employed by him for the purpose of cleansing the iron and producing a metal of purer grain. Cort's second patent relates to his improved method of manufacturing bar iron from the ore or from cast iron. This method was a happy combination of processes practiced before his time; he employed the reverberatory or air furnace, without blast; and, he worked the fused metal with iron bars until it was brought into lumps, when it was removed and forged into malleable iron. The bottom of the reverberatory furnace was hollow, so as to contain the fluid metal introduced into it by ladles, the heat being kept up by pit coal or other fuel. When the furnace was charged, the doors were closed until the metal was sufficiently fused, when the workmen opened an aperture and worked or stirred about the metal with iron bars, when an ebullition took place, during the continuance of which a bluish flame was emitted, the carbon of the cast iron was burned off, the metal separated from the slag, and the iron becoming reduced to nature, was then collected into lumps or loops of sizes suited to their intended uses, when they were drawn out of the doors of the furnace. They were then stamped into plates, and piled or worked in an air furnace, heated to a white or welding heat, shingled under a forge hammer, and passed through the grooved rollers after the method described in the first patent. As there are not fewer than 8,200 of Cort's furnaces in operation at the present time in Britain alone, we need not speak of the great advantages of his system of conversion. His great merit consisted in apprehending the value of certain processes as tested by his own and others' experience, and combining and applying them in a more effective practical form than had ever been done before. This power of apprehending the best methods and embodying the details in one complete whole, marks the practical, clear-sighted man, and in certain cases amounts almost to genius. The merit of combining the inventions of others in such forms as that they shall work to advantage is as great in its way as that of the man who strikes out the inventions themselves, but who, from want of tact and experience, cannot carry them into practical effect. The reward which poor Cort received for having done so much to develop the great resources of his country was—ruin. He was made answerable for the defalcations of Adam Jellicoe, the deputy-paymaster of seamen's wages, and father of his partner, and had to give up his works. After a hard struggle with want, he obtained a pension of £200 a year for the support of his destitute family of twelve children. "In the opinion of Mr. Fairbairn, of Manchester," says our author, "the inventions of Henry Cort have already added six hundred millions sterling to the wealth of the kingdom, while they have given employment to some six hundred thousand working people during three generations. And while the great ironmasters, by freely availing themselves of his inventions, have been adding estate to estate, the only estate secured by Henry Cort was the little domain of six feet by two, in which he is interred in Hampstead churchyard."

How Statues are Made.

A correspondent of the London *Reader* gives the following details regarding the production of statues:

"The sculptor having designed a figure, first makes a sketch of it in clay a few inches only in hight. When he has satisfied himself with the general attitude, a cast is taken of his sketch, and from it a model in clay is prepared of the full size he designs for his statue, whether half the natural hight, or life-size or colossal. The process of building the clay, as it is called, upon the strong iron *armatura* or skeleton on which it stands on its pedestal, and the bending and fixing this *armatura* into the form of the limbs, constitute a work of vast labor of a purely manual sort, for whose performance all artists able to afford it employ the skilled workmen to be obtained in Rome. The rough clay, rudely assuming the shape of the intended statue, then passes into the sculptor's hands and undergoes his most elaborate manipulation, by which it is reduced (generally after the labor of several months) to the precise and perfectly-finished form he desires should hereafter appear in marble. This done, the *formatore* takes a cast of the whole, and the clay is destroyed. From this last plaster cast again in due time the marble is hewn by three successive workmen. The first gives it rough outline, the second brings it by rule and compass to close resemblance with the cast, and the third finishes it to perfection."

Formosa Camphor.

The manufacture of this article has for some years been monopolized by the Taotai (or Head Mandarin) of the island, and its sale farmed out to wealthy natives. In former years a good deal of the drug was clandestinely produced, and smuggled across to China, where it was largely bought up by foreign speculators and carried to Hong-Kong for shipment to Calcutta, at which place it finds the readiest market, being used by the natives of Hindostan for lubricating the body and other domestic purposes. But now its monopoly is so closely watched that almost the entire trade in it falls to the lucky individual whose Chinese agents can secure the monopoly. This bad system has occasioned the price of the article in Hong-Kong to increase considerably in value, and to make the profits accruing to the fortunate monopolist almost fabulous. The cost of the drug, I learn, amounts to only six dollars at its place of manufacture. The monopolist buys it from the Mandarin at sixteen dollars the pecul and sells it in Hong-Kong at twenty-eight dollars. The gigantic laurel (*laurus camphora*) that yields the camphor, covers the whole line of high mountains extending north and south throughout Formosa. But as the greater part of this range is in the hands of the aborigines, the Chinese are able to gain access only to those parts of the mountains contiguous to their own territories that are possessed by the more docile tribes. The trees, as they are required, are selected for the abundance of their sap, as many are too dry to repay the labor and trouble of the undertaking.

A present is then made to the chief of the tribe to gain permission to cut down the selected trees. The best part of the tree is secured for timber, and the refuse cut up into chips. The chips are boiled in iron pots, one inverted on another, and the sublimated vapor is the desired result. The camphor is then conveyed down in carts of rude construction, and stowed in large vats, with escape holes at the bottom, whence exudes an oil, known as camphor oil, used by Chinese practitioners for its medicinal properties in rheumatic diseases. Samples of this oil have been sent home, and it may eventually become a desideratum in Europe. From the vats the camphor is stowed in bags to contain about a pecul each, and is thus exported. The Chinese Government has empowered the Formosan authorities to claim on its account all the timber produced by the island for ship-building purposes; and it is on this plea that the Taotai appropriates the prescriptive right of dealing in camphor. About 6,000 peculs of the drug are annually produced in the neighborhood of Tamsuy.—*Robert Swinhoe.*

Granada Cotton.

We have received from E. Flint, M. D., of Granada, Nicaragua, one sample of the native cotton of that country, and two different kinds of cotton seeds, which he collected in the mining part of that State. The color of the cotton is a buff, and darker in the shade than the yellow variety of Nankin. It remains unaltered by washing and is used by the native Indians in manufacturing their common hand-made, coarse cloth. The fiber is coarse and short, but very strong, and it will make a durable quality of cloth. Dr. Flint states that the seeds are of the white variety of cotton, which is prized on account of the facility with which it parts with its seed, thus rendering it very easy to gin. Each head or boll of cotton contains from three to five kidney-shaped seeds, arranged almost like the grains on a short, thick ear of wheat, and it is called the kidney variety on account of the shape of the seeds. The buff-colored cotton will grow in a colder climate than the white variety.

A NEW ISLAND IN THE MEDITERRANEAN.—A new Mediterranean island has come to the surface, off Palermo. It is a volcanic phenomenon, and appeared for the first time a few years since, and was taken possession of by the Neapolitan Government and named Fernandia, but disappeared one fine day and sank to the bottom, and has just come up again to the great delight of the scientific world. An English vessel, with several members of the learned societies on board, has just anchored off Palermo to take observations, which cannot fail to be of great scientific interest.

IN cargoes of ice, which have been shipped from Boston to the East Indies, have frequently been placed considerable quantities of apples, which have reached their destination in as good condition as when first shipped.

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Correspondence

Heaton's Defensive Armor.

MESSRS. EDITORS:—In your last issue you publish an "official report" of practice with my system of defensive armor in the Washington Navy Yard. That report does me great injustice, and also implies falsehood in my previous statements; this implication (intended or not) compels me to give my side of the story (which I can prove to be substantially true) so that your readers may be able to judge for themselves as to the merit or justice of the case.

The target you illustrate as mine was *not mine*, inasmuch as it was not made to my directions. I was not present when it was fired at. It was an abortion, being only 4 feet square, or 16 times the size of the shot on its face, and lastly, it was not the target to which I alluded as being successful in my former statements. All of my attempts to bring my invention before the Government failed, until I obtained letters of introduction from parties known to the Departments, which gained me a hearing and a test. This test I abide by. The target was made somewhere near what I wanted, and it was successful. It was an old target, slightly damaged, having been shot at, the shot striking at an angle of about 45°; the result was it was broken by the shot in the center, and cracked above and below the shot-mark; the iron plate was also "sprung" or bent by the blow, which did not admit of my timber being put on as properly as it would otherwise have been; still we made it answer the purpose. It was the usual size, *i. e.*, 8 feet ×4 feet—formed of one 4½-inch iron plate and 20 inches of timber backing. The Washington Navy Yard may be said to be full of such targets, which (I think) in every instance had been penetrated under such tests as mine was subjected to, and not only penetrated, but the ball generally, after passing clean through the target, penetrates the bank behind from 4 to 12 feet. My target was one of them, and a damaged one, at that; the only addition I made to it was to cover the lower half with timber, twelve inches thick, which was equivalent in weight to about ⅝th of an inch additional iron. The gun was charged with 30 pounds of powder and an XI-inch or 168-pound shot, and at 60 or 70 feet range, it was fired at my target. The ball did not penetrate it, being checked by the timber; the ball was broken to fragments against and in the iron plate, which was broken but not penetrated, the wood backing being practically not injured. The target was driven into the solid bank at such an angle that, had it not have been secured by a cable at the top (it being on end perpendicular), it would have fallen over on its face; thus showing plainly that my 12 inches of timber outside offered more resistance than the 20 inches behind, besides the penetration in the bank, which, at a mean calculation, would be 8 feet; besides which the plate was not really penetrated. This result (which I cannot believe has been purposely withheld from the public while the other was published—I think it must have been an oversight) was at all events sufficiently favorable to cause the Department to order two new targets to be made and tested, one on my system, and one an ordinary iron-clad, both to contain the same amount and kind of material, and to be subjected to the same test, to show the comparative resistance. The first target had given an idea of what might be expected from a new target made according to my directions, but it had also taught a lesson which I suspect was not satisfactory in some quarters, which was, that if I was permitted to have my own way too much I should be successful in proving my assertions; accordingly I was not permitted to have anything to say in the making of the two new targets, my directions were not noticed, and I could not induce the authorities to listen to my remonstrance. In vain did I assert that a target only 4 feet square was not large enough—that the wood could not be secured so as to offer the same resistance to the splitting action of XI-inch round shot, as a larger surface would do, when the piece struck would be sustained by the weight of the surrounding timber. The foreman of the work in charge of its construction knows that before it was finished I pointed out to him that when the middle stick of timber (there being only three in the target) should be struck in its center by XI-inch shot, it would be cut in halves, and one piece sent one way and one the other; and this is just what did take place; and he also knows that I was not in any way satisfied with the way it was made, though he was not to blame; he was governed by directions which were not mine, which directions prohibited the target being over 4 feet square. This target, which was so out of all proportion to the shot, I then and now repudiate. I did not and do not consider it a fair impartial test. It is possible to conduct any experiments so as to hide or keep back the advantages, either by oversight, ignorance, or design, and in this way the test you have illustrated as mine was conducted. I wish to distinctly state—"official reports" to the contrary notwithstanding—that I can, by my system, reduce the weight of a ship's armor 33 per cent without reducing its resistance to penetration, and that I am ready to prove what I state whenever the Government will offer me the opportunity of doing so, and grant me the privilege of having my own target made in my own way, when I guarantee to do what I claim or forever after hold my peace. I trust I do not need to learn what is practicable, but I cannot be supposed to make a practicable target, when not the smallest attention or respect is given to my directions, when I am treated in such a way as to make me feel myself a nuisance, and when the behavior of officers is so very disagreeable as to prohibit anything like a second attempt at either remonstrance or argument. "One story is good till another is told." Your publication of the official report is one story—this is another; and I know you are too truly the inventor's friend and the advocate of scientific development and improvement, to refuse me room in your paper to place the matter clearly before the public and to counteract the damage done me by the publication referred to. Trusting you will send to the Department for the "official report" of the experiment I have alluded to, and that you will illustrate it as soon as you conveniently can, I remain respectfully,

C. W. S. HEATON.

New York, Jan. 25, 1864.

Patent Fees to Canadians.

MESSRS. EDITORS:—I acknowledge with thanks the receipt of your favor, and must confess that I am, unfortunately, a Canadian; I regret that our Government has forced your Congress to pursue such a course of recrimination in regard to the issue of patents. The grounds of complaint on the part of the Federal Government must be indeed weighty to cause said Government to retaliate upon the policy of the Canadian Cabinet, by proportioning the fee as $35, to $500, in favor of all other nationalities, against Canadian inventors. This operates against the introduction of Canadian inventions more now than formerly, as the stupendous war at present carried on by the Northern Government presents greater incentives to the reception of any novel ideas, to increase their naval superiority, than the Canadian Colonial Government in its peaceful state could be susceptible of. Until a more liberal policy is enacted my principles must remain in seclusion. M. McD.

Kingston, C. W., Jan. 23, 1864.

[When the Patent Laws were amended, March 2, 1861, it was the intention of Congress, in establishing the rate of fees, to recognize the widest possible reciprocity, toward all other Governments. The language of the law is that "all laws now in force fixing the rate of the Patent Office fees to be paid, and discriminating between the inhabitants of the United States and those of other countries which shall not discriminate against the United States, are hereby repealed." It so happened that Canadians were the only people who chanced to fall under the bar of discrimination, and their Government is the only one which has a patent system like the Japanese policy that seeks to shut out all foreigners from reciprocal advantages, so far as patents are concerned. The law of Canada is so framed that none but resident subjects, who must be original inventors, can take out patents there. Just so soon as the Provincial Parliament makes up its mind to treat all inventors alike, then our system adapts itself to Canadian inventors, and gives them the same rights that we enjoy. We have always characterized the policy of our Northern neighbors, in this particular, as narrow and bigoted; and we trust that it will soon be amended, though we confess, when we call to mind the futile efforts which have been made to reform the system, that we expect but little.

Locomotive that supplies Itself with Water while Running.

In a late paper read by D. K. Clark, C. E., before the Association of Mechanical Engineers, England, the following description of a peculiar feeding locomotive is given, as one of those that was at the International Exhibition of 1862:—

The outside cylinder engine, exhibited by the London and North-Western Railway, is one of a numerous class running the express trains on that line, and contrasts in several respects with the inside cylinder engine. It weighs only 27 tuns in working order, and the tender 17½ tuns, making a total of 44½ tuns, as against 60 tuns for the other engine; and the weight on the driving wheels is only 11½ tuns instead of 14¼ tuns. The weights on the several wheels are—

	Inside cylinder engine.	Outside cylinder engine.
Leading wheels.....	11·90 tuns.	9·40 tuns.
Driving wheels.....	14·30 tuns.	11·50 tuns.
Trailing wheels.....	18·50 tuns.	6·10 tuns.
Total weight	34·70 tuns.	27·00 tuns.

The fire-box is of the ordinary form, with little more than half the grate surface of the other engine; and it is fitted for coal burning, with a fire-brick arch and two air openings in front, closed by a regulating flap. The heating surface of the fire-box is 85 square feet, being little more than one-third that of the inside cylinder engine; and there are fewer tubes, but then they are 2½ inch apart. The other engine gains the advantage in the greater size of blast orifice, which is 5¼ in. diameter for the inside cylinder engine, and 4½ in. for the outside cylinder engine; owing to the larger area of grate in the former engine, which does not require the same sharpness of blast to draw the air through.

Regarding the engines as carriages, the height of the center of the boiler in the inside cylinder engine, 7 ft. 5½ in. above the level of the rails, is considerable, and tells upon the rails when the engine sways. In the outside cylinder engine, though the driving wheels are as large, the center of the boiler is 11 in. lower; and this in connection with a compact wheel base and a balanced driving wheel, produces a safe, steady, and easy-running engine. In both the engines feed pumps are displaced by two Giffard's injectors.

The outside cylinder engine is fitted with a duplex direct-action safety valve, in which a pair of valves are pressed down by a cross-bar with a spiral spring attached to the bar midway between the two valves—a decidedly superior arrangement to the ordinary weighted lever, since this valve cannot be tampered with, and is much more prompt in discharging an excess of steam, as it opens wider for a given excess of pressure. The smoke-box is furnished with a descending hopper at the bottom, having a small opening not closed, through which ashes and ignited cinders are allowed to escape constantly; thus over-heating of the smoke-box is prevented. The reversing gear is worked by a screw and hand-wheel, instead of the usual long lever and notched sector; this reversing gear, which is applied to nearly 200 engines, is more easily worked, saving the engine man a great deal of fatigue.

The tender of this engine, exhibited with it, has six wheels, and weighs empty 9½ tuns, full 17½ tuns, the load being equally distributed on the wheels. It is fitted with the apparatus for picking up water whilst running—a scoop is let down from the bottom of the tender, and dips into the water contained in a long open trough between the rails, from which it is made to flow up the scoop into the tender in running. A minimum speed of more than 15 miles per hour is required for this operation. Three of these water troughs have now been laid down and are in use in different situations on the London and North-Western Railway; and their advantages are that the size and weight of the tender for running a given distance may be reduced, the number of stoppages lessened, and time saved. An express engine has thus been enabled to run the whole distance from Holyhead to Stafford, 130½ miles, in one continuous run, without a single stoppage, at an average speed of 54½ miles per hour.

IT is stated that the iron-clad, *Tonawanda*, has armor 5 inches thick, backed with 5 feet of timber.

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INVENTIONS AND DISCOVERIES ABROAD.

Factitious Blocks of Wood.—A patent has been taken out by G. Colomb, of Aigle, Switzerland, for making ornamental blocks of wood as follows:—He takes the shavings of soft pine or other wood, and dyes them different colors, then packs them together so as to form a truss, which is put into a frame and dipped into a solution of warm glue; it is then subjected to severe pressure and formed into a block, after which it is dried with a current of hot air in a warm room. Such blocks of wood may be cut and used for ornamental purposes, as substitutes for high-priced natural woods that are employed for cabinet work.

Salinometers for Marine Boilers.—The sea water used in marine boilers contains about one-third of salt, and as steam is evaporated from it the brine becomes more dense; hence the boiler has to be blown out regularly when the water in it attains to a certain density. An instrument called a salinometer is employed to measure this density, yet considerable trouble has been experienced in determining the times of blowing off. A patent has lately been taken out by J. Burrell, of London, for an improvement in salinometers. He leads two pipes, the one from the top and the other from the bottom of the boiler. These pipes he connects with a glass tube, so that the said tube forms a connection between the two pipes. The arrangement is thus very similar to the ordinary water gage of a steam boiler, but differs from it in the employment of a considerable length of pipe above and below the glass tube. In the upper pipe into which the steam from the boiler enters condensation is constantly going on, and the water thus distilled runs down and fills the lower pipe. The water stands in the glass tube as in an ordinary gage tube, but its level will not be the same as that in the boiler; for the weight of the salt water in the boiler will raise the column of the distilled in and above the glass tube, to a hight considerably above its own level. An ordinary gage gives the water level of the boiler, and this, when compared with that of the salinometer gage tube, will indicate on a scale attached, or by reference to a table, the density of the water in the boiler.

Purifying Petroleum.—Crude petroleum, also coal oil, is first distilled, then treated with sulphuric acid and subsequently with caustic alkali, before a second distillation. John Cassell, of London, has secured a patent for the use of a mixture of the bichromate of potash and caustic soda, mixed with the oil in the second distillation. The quantity used is one part of bichromate of potash, and two parts of caustic soda at 36°, and they are then distilled. Potash may be substituted for soda; and, instead of bichromate of potash and caustic alkalies, any of the salts of chromium, or in combination with alkalies, caustic or otherwise, may be used, although it is preferred to use them as stated above. If the oil, like that of some shales, is difficult of purification, it may again be be treated with sulphuric acid and caustic soda, and distilled a third time.

Coloring Substances for Dyeing and Printing.—A. H. Hoffman, of London, has taken out a patent for an improvement in manufacturing aniline colors. He takes the substance known as rosaniline, which is the base of the various salts called roseine, magenta and fuschine, and he mixes it with the iodides or the bromides of the alcohol radicals, such as iodide of ethyl, methyl, amyl, propyl, or capryl, or bromides of these. He takes one equivalent of rosaniline and three of the salt of the alcohol radical, and heats the mixture to a temperature of 212° Fah., or somewhat higher, in a close vessel. An iron vessel with a safety valve is the best to use for this purpose. During the heating the mixture passes through several phases of coloration, and is eventually converted into a blue violet; but the longer it is subjected to heat, under pressure, it becomes more nearly a pure blue. This color is employed, dissolved in alcohol, for dyeing and printing.

New Mode of Rifling Guns.—No general principle of rifling guns seems to be recognized and practiced in the rifling of guns. Regular and increasing twists of various pitch are used by rifle makers for guns of the same bore. Capt. T. A. Blakely, the inventor and constructor of the best guns of large caliber in Europe, has taken out a patent for the application of a new principle in rifling. It consists in rifling guns and in forming projectiles in such a manner that the same power shall always be exerted. The patentee first decides at what distance from the center of the projectile the turning force of the spiral shall act, and the smaller the bore the nearer the center it acts. He says:—"Let a circle be now drawn, with a center in the axis of the barrel, the radius of which circle is this settled distance; then form the rifling of such a shape that a line perpendicular to any point of its surface shall also be a tangent to this circle." The projectiles are formed to correspond and follow the same mathematical rules with respect to the shape of their external surfaces.

Projectiles for Ordnance.—W. Palliser, of Dublin, Ireland, has taken out a patent for manufacturing chilled cast-iron and chilled cast-steel projectiles.

Safety Garments.—R. Brooman, of London, has taken out a patent for manufacturing oiled silk or india-rubber garments double and in compartments, so that they may be inflated with air through a valve and thus rendered life-preservers. Every person going to sea should have a jacket of this character.

Note on a Chinese Tea-Chest.

The London *Grocer* says:—

We have just now before us one of those small square wooden tea-cases, in which are packed, for sale in the English and other markets, the finest kinds of the valued Chinese plant. This little tea-case is worth some remark on account of the peculiarities of its decoration.

The box is about a foot square, and each side is differently ornamented. The surface is varnished in a dead flat manner—a plan which might be usefully adopted in connection with many of the paintings of both ancient and modern masters, instead of giving that brightly polished surface which often catches the light and renders the work invisible except from one position.

At a first glance, it might be thought that the patterns of the tea-chest were cleverly painted on a light buff ground: a more close examination shows, however, the yellower tint on which, in green and black there are printed, most likely from woodcuts, the representations of fruit, trees, birds, butterflies, elephants, &c. In the combination of these forms no account seems to be taken of the comparative sizes, nor are the shapes in accordance with nature. The veins of the leaves are carefully shown on the delicate green in black markings. The general style of this ornamentation is not unlike that of some of the English Mediæval wall-painting and tapestry. Round the edge of each square there is a running scroll pattern, about half an inch in width, of a dull madder scarlet color, on a ground nearly white. This has been printed in slips, which, when cut of the proper length, have been pasted on the box. In the centre of most of the compartments, badly printed in black, on a deep orange ground, are the mark of the merchant and other devices: each side is of a different pattern, and the general effect of the arrangement of the colors is rich, and, at the same time, harmonious and delicate.

The green color seems to be some vegetable preparation, which is more pleasant to the eye and more wholesome than those arsenical tints which have caused so much mischief. The black used for the merchants' marks on the tea-chests is remarkably intense; deeper, we think, than that used for the finest book-printing of the present day.

Taking note of this simply as a case for a particular description of goods, the care and taste with which it is got up contrast with the way in which these matters are managed at home. Some will say, "What odds about the case if the contents are of a high quality?" This is not wise, for however excellent an article may be, its worth is enhanced in both the home and foreign markets by a tasteful and well-designed inclosure. There has been of late years considerable improvement in this way, but much more remains to be done.

Many of the cases for preserved fruits, articles of silk mercery, artificial flowers, and gloves, which come from France, Italy, Switzerland, and elsewhere, and are seen in such large numbers, especially about Christmas time, are very pretty, and some have considerable artistic merit.

THE masts of a new French iron-clad just launched, near Toulon, are of a single piece each. The timber was obtained in California. Built-up masts are said to be much stronger.

Convention of Wool Growers.

A convention of wool growers was held on the 5th and 6th inst., at Columbus, Ohio, which was well attended. Two prominent general questions were discussed, namely:—Is washing sheep advantageous? Is the tariff on foreign wool adequate protection to the American producer? Mr. Montgomery stated that the loss to sheep owners from dogs in the State of Ohio amounted to $200,000 per year. Lieut.-Gov. Stanton made an address upon the tariff, claiming that it was not sufficient to protect the great and growing interest of sheep husbandry. Col. Daniel Needham of Vermont, who was the Commissioner from Vermont to the International Exhibition of Sheep at Hamburg, delivered an address on the "triumph of the Vermont Sheep at the International Exhibition." In the course of his remarks he said, "to George Campbell, of Vermont, belongs all the honor that attended the success of the American Merinos." He took twelve little sheep—six bucks and six ewes, and surprised all Europe with the fact that America contained better Merinos than all the world beside; and not only did he surprise Europe but America also, which never before had dared to claim for herself the leading position in the production of stock-breeding Merinos. These sheep were of Mr. Campbell's own breeding; and the fact that they took from the best flocks of Germany and France the two first premiums, is an honor of which America may well be proud. Mr. Henry S. Randall, LL.D., of New York, editor of "Sheep Husbandry," "The Practical Shepherd," &c., also addressed the assemblage. He argued that the sheep interest of the country was on the increase and likely to be, although wool and sheep would, in the future, have the depressions that they had suffered in the past. He also argued that the cotton culture of the country, after the rebellion, would be of more absorbing interest than ever before; that cotton culture was a healthy occupation, and might be engaged in by white as well as black labor.

The Earth made Cold by Heat.

Professor Agassiz lately delivered a course of three lectures before the Smithsonian Institute, Washington, and the greater part of the last one was devoted to a description of the phenomena which indicate that the continent of North America had at one time been overlaid by dense and unbroken masses of ice, moving from the North to the South. The traces of such an agency are found in the peculiar drift deposited on the surface of the continent, from the Arctic to the 36th or 40th parallel of latitude, being in its nature and composition such as would be deposited by immense cakes of ice, pushing forward the debris of the soil over which they moved, and bearing on their top the irregular masses of stone which are found in the region designated. That the direction of this moving ice was from north to south is proved by the abrasion of hills having an acclivity facing toward the north, where the southern descent is without such characteristic marks.

After stating the grounds on which the "earthquake theory" was inadequate to explain the phenomena of this drift, Prof. Agassiz estimated that the ice which deposited this drift and produced its other attendant phenomena must have been five or six thousand feet thick. But whence came the cold which produced such a thickness of ice? This query was answered by supposing that there had been injected into the sea from the subterranean fires of the earth below it a vast mass of melted material, thus generating an immense volume of vapor, which, escaping for ages into the upper air, was condensed and fell in the shape of snow and hail. By this mass of snow and hail the temperature of the earth's climate was reduced from the comparative warmth which preceded it, even in Arctic regions, and the world entered on the "cold period," which it was the object of the lecturer to describe and to account for while describing. Prof. Agassiz said that this period was the winter which preceded man's advent in the world.

THE total cost of the monitors, built and being built, will be $22,150,000. Twenty other monitors—light draft—are building at a cost each, complete, of $465,000, all designed for inside work—river and harbor defense.

MORE shells were discharged in the single battle of Gettysburg than were employed in all the battles that Napoleon ever fought.

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Oliver's Kiln for Drying Lumber.

The engravings published herewith represent an improved arrangement for seasoning or drying lumber by steam, whereby the sap is extracted, and the timber rendered fit for use in a short time.

The lumber is packed in a store house, or kiln, which is shown in perspective in Fig. 1, and in plan at Fig. 2. The steam pipes, A, extend over the bottom area of the kiln, and are connected at their outer extremities, B, with a steam boiler situated outside the building; in some cases the boiler is placed underneath the building itself, where the steam pipes are showing in this engraving; the plan here delineated is the one generally preferred. The supports, C, carry the lumber to be dried, which is arranged at right angles with them, the ends of the timber abutting against the partitions, D. These partitions are wadded with some resilient or soft absorbent substance, shown in the engraving by the dark lines.

Fig. 1

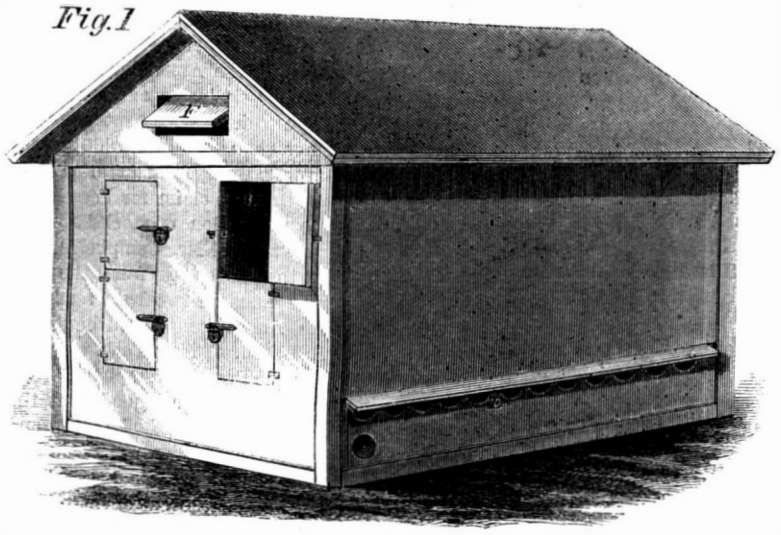
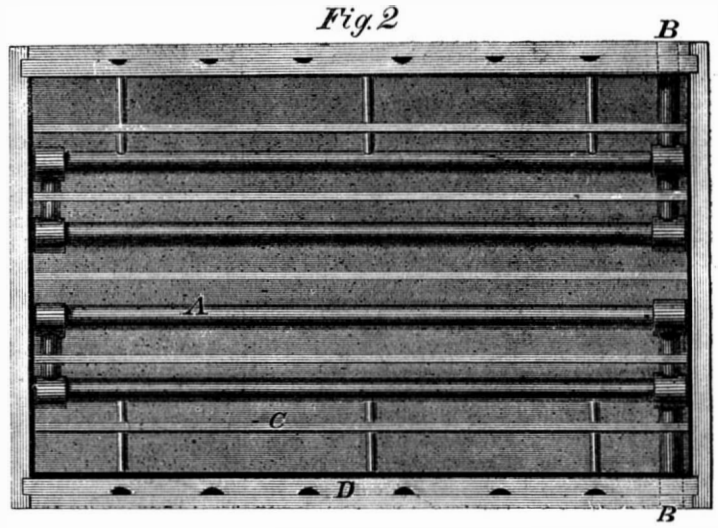


Fig. 2



OLIVER'S KILN FOR DRYING LUMBER.

The method of drying lumber in this kiln is as follows:—the lumber is arranged transversely with its ends in contact with the wadded partitions, one or both of which may be made movable, to be accommodated to lumber of different lengths. The lower tier of lumber is supported upon the ledges projecting from the sides of the kiln; strips are then laid upon it lengthwise of the kiln to receive another tier of lumber, upon which similar strips are placed to receive a third tier of lumber, and so on as high as may be desired. The lumber is then heated by radiation from the steam pipes placed some distance below, as shown in Fig. 2, and about equal distance from either end. Steam is admitted to the chambers by other pipes and cold air is admitted to the same chambers through openings, E, in the outer walls of the building, see Fig. 1. The wadding in the partitions becoming thoroughly moistened by the condensation of a portion of the steam by the cold air, keeps the ends of the lumber moist, and the natural channels or pores of the wood open, and as the greatest heat from the pipes is applied at the middle of their lengths, the sap is caused to be rapidly extracted without checking the lumber, and the drying may be entirely completed by gradually diminishing the quantity of steam, and continuing the heat some time longer.

Suitable doors are provided for the admission of the lumber, and also a ventilator, F, at the top.

This invention was patented, June 24, 1862, through the Scientific American Patent Agency. For further information apply to H. W. Oliver, patentee, Box 934, New Haven, Conn.; or, S. C. Lewis, Whitneyville, Conn.

A NEW HORSESHOE WANTED.

The editor of the *National Eagle*, published at Claremont, N. H., is evidently a go-ahead man. In a recent number of the *Eagle* we find the following article :—

"If we had possessed the requisite genius, we should before this have invented, patented and made a fortune out of an article which every man who owns a horse, especially a family or fancy horse, really requires, namely, a set of horseshoes, made of steel and finished in a neat manner, which any person can have in his stable ready for use and put on when the horse is harnessed and going out upon the road, and taken off when brought in and unharnessed. It is of course required that the fastening shall be simple, safe, and not liable to get out of order, to cramp or hurt the foot, nor to impede freedom of action. The simple statement of the want will, we doubt not, be understood and appreciated by every horseman. Even to those horses which are in constant service it would be a relief and a benefit at night to have their shoes off; but to that large class of family and sporting horses which are on the road only at the pleasure of their owners and which are frequently idle for days and weeks at a time, the benefit would be incalculable. Many a valuable horse has had his feet ruined by the inflexible iron shoe nailed and riveted to his hoof, there to remain for weeks, and often for months, without change, while the hoof was growing, but with no chance to expand and take the natural shape of the natural or wild horse of the desert or prairie. Thousands of horses are hitched in their stalls, their feet raised from the floor by the thickness of their shoes and calks, there to dry and cramp, become feverish and painful to the poor brutes, promoting thrush, windgall, spavin and various other ailings, besides those concerning the feet alone.

"Who will produce the shoes—perfect and complete—and make over to us half the invention upon our assuming the expense of getting out the Letters Patent? To any inventor complying with the above suggestions and conditions we will pay a cash premium of $1,000.

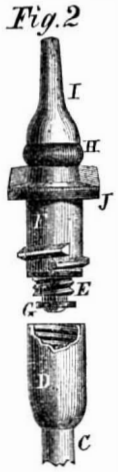
LYNDE'S PORTABLE SODA FOUNTAIN.

We place before our readers this week two engravings of one of the most convenient as well as useful apparatuses we have seen in a long time. It is simply a portable soda fountain, so arranged that the contents can be discharged in small or large quantities to suit individuals. Such an arrangement as the one above indicated is a very convenient one, and for picnic and festal occasions of all kinds, this fountain is a most excellent thing, as it dispenses with carrying clumsy bottles which, in addition to the loss from breakage, occupy a great deal of room, and are in various other ways inconvenient.

Fig. 1

This fountain is now in successful operation in Philadelphia, and is constructed of the best materials in an improved manner; we do not think it necessary to present a section of the interior, as our readers will readily understand the main points when we say that the outer case, A, is an ornamental iron casting and contains a glass bottle or demijohn, similar to the well-known vessel of that name. This glass demijohn is slightly smaller than the case, so that there is a space all around between the two; this space is filled with plaster of Paris or cement, for keeping the liquid cool. The draught tube, B, connects with a glass tube, C (see Fig. 2), which runs to the bottom of the fountain; this tube is fastened to the cap, D, and the cap itself screws on to the thread, E, just above it.

Fig. 2



The valve and its attachments are contained in Fig. 2. The tube, F, screws into the mouth of the case by the helix on its lower end. In this tube the valve spindle works, and the valve itself is simply a disk of india rubber, G, shown off its seat in the engraving. This valve spindle is connected to a rubber diaphragm, H, which acts as a spring, and holds it up against the rubber seat. The draught tube is made longer than shown in Fig. 1, and is slipped over the nozzle, I, from whence it can be immediately removed if necessary. There is a rubber joint at J to keep the tube, E, tight. By this arrangement all that is necessary to draw the soda is to press on the draught tube with the hand; the valve, G, is then opened and the contents rush out. As pressure from within always acts upon the valve no leakage can occur; when the tube is removed the cup on the handle is to be slipped over the nozzle as a shield.

The inventor writes us, saying :—"The value of this improvement, beside the purity of the contents (being always in glass), is its practicability in taking the place of small bottles; while it costs no more it saves full half the labor and usual loss of bottles, and is a source of greater profit and less trouble to the retailer; and the customers get pure and fresh soda water."

A patent was granted on Oct. 20, 1863, for the said improvement, to John D. Lynde, of 247 North 9th street, Philadelphia, Pa., to whom communications may be addressed in regard to it.

A CORRESPONDENT of the Chicago *Times* says that one of the ordinary fine wire gauze masks, such as are frequently worn at masquerades, put over the face, is a sure protection against the cold. The writer says he tested one, in a ride of three miles against the wind, with the thermometer sixteen degrees below zero, and therefore he knows whereof he affirms.

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Contents:

(Illustrations are indicated by an Asterisk.)

*Reynolds & Babcock's Steam Pump	81	Inventions and Discoveries abroad	87
Anticipation of the Telegraph	81	Notes on a Chinese Tea-chest	87
Southern News	82	Convention of Wool Growers	87
Shot and Shell	82	The Earth made Cold by Heat	87
Indolence and Industry	82	*Oliver's Kiln for Drying Lumber	88
An Asphaltum Lead near Buena Vista Lake	82	A New Horseshoe wanted	88
Miscellaneous Summary	83	*Lynde's Portable Soda Fountain	88
Business Failures during the year 1863	83	Taps and their Construction	89
Submarine Warfare	84	The Nature of Science	89
Two Great British Armor-clads	84	The Power of Steam	89
*Improved Hot-Blast Grain Dryer	85	Currency—Money	89
Henry Cort, Inventor of Iron Puddling	85	Rebel Submarine Battery	90
How Statues are made	85	Of Precious Stones	90
Formosa Camphor	86	The Forthcoming Sanitary Fair	90
Granada Cotton	85	Nature of Substances for giving Light	90
Heaton's Defensive Armor	86	Recent American Patents	91
Patent Fees to Canadians	86	Patent Claims	91, 92, 93
A Self-feeding Locomotive	86	*Harris's Steam Boiler	96
		An "Opium Hell" in Java	96

TAPS AND THEIR CONSTRUCTION.

A good set of taps and dies is one of the most valuable properties in a machine shop, but the various forms adopted for them show that, sometimes, very little attention is given to the nature of the work required. The strain brought upon a screw thread is tremendous; in some places the lives of thousands of persons depend upon the fidelity with which the machinist has done his work; in any event, economy and good workmanship alike call for thoroughness. A discussion of the pitches proper for certain sizes of bolts is not necessary, as that question is pretty well settled now to the satisfaction of intelligent men; and if some unanimous action was held by those persons most interested on the question of adopting a standard, there would doubtless be very little further complaint made about uneven threads and fractional pitches. The office of a tap is to cut out certain parts of the iron and leave the others in relief; in plain terms, to form a thread by actually *cutting;* this is impossible with some taps, for, by the angles of the edges cutting is impossible; bruising would be a more correct term. Some roughly-made taps are cut with a chaser, and to complete the clumsy job are planed square on the sides. Such a tap is good for nothing but to raise a thread in soft metal, such as Babbitt-metal, lead and copper. It is not fit to use on steel or iron, because it does not cut its way, but squeezes the iron up into ridges. A thread of this kind has no strength, because the iron is crushed by the tap, and the fibers comprising it are twisted and torn by the passage of the tool. Taps are also made by cutting many grooves all around the circumference, which lead one way, like the teeth of a circular saw, only a little more rounded on the back. This is a good form for a tap that cuts in one direction only, or for a finishing or "plug" tap to run down, after a stouter one has formed the thread. The chief trouble with it is, that if the grooves are many in number, the edges of the thread or teeth break off and ruin the tool; this is certain to occur if the tap is turned backward; the threads will be shelled off like corn from a cob. Another form for a tap is to cut four grooves at equal distances up and down the body; these grooves are to be made with a round-nosed tool, and as the cut would be straight as the tool was fed down, the sides of the grooves must be run under, slightly, so that the teeth will be hooked, or hawk-billed to some extent; this form permits the tap to be used either way, backward or forward, without danger of breaking off the teeth or threads. Working a tap back and forth is an indispensable feature in tapping large holes, where the strength of the workman and the quality of the work render it improper to force the tap straight through. Of course, when the tap is large, the number of grooves must be increased, and for very small ones even less than four may answer.

All things considered, we prefer this form of construction over any other. The object in making a tap is to obtain a tool that will do the work well and be durable; these ends are attained in the plan mentioned. We have seen a number of "fancy" taps at various times, which would have answered for surgical operasions, so keenly did they cut. Of this variety, one made like a half-round rimmer, or cut clear down to the center, performed very well, except that it had this defect—it made the thread larger at the top than below, for it was impossible to steady it when first entered.

We have also remarked the mischievous practice of using chasers on taps; such a tool is not needed and is obviously a damage instead of a benefit to the work in hand. Every tap should be finished in the lathe by the same tool that cut it, as it can be, by good workmen. No man can carry a chaser over a tap as steadily as a slide rest can move, and a little divergence of the chaser to one side or the other makes the thread uneven and irregular, or, as machinists call it, a "drunken thread." Tempering taps and dies has a very great effect upon the durability and execution of them; no matter how well the machinist performs his part, if the hardening is defective the time has been wasted. This subject will be discussed at some future period.

THE NATURE OF SCIENCE.

Many persons entertain the most erroneous notions respecting the character of science. They think and speak of it as if it were some mysterious intellectual subtlety, revealed to the few and denied to the many. Such ideas may have come down from the olden times when all men believed sincerely in mysterious powers communicated through incantations and charms by deities and spirits who had power over "the earth, the water, the air and fire." The ancient alchemists and astrologers kept what they called "science" secret, as something too sacred to be communicated to the mass of men; hence they taught favorite disciples only. Many of these old plodders in the paths of science were sincere in their peculiar views, but it must be admitted that too many of them employed secret discoveries in chemistry for the purpose of astounding their unlearned fellow-men by their curious experiments, in order to obtain power over them. Astronomy also, such as a superior knowledge of eclipses and the movements of the heavenly bodies, was employed in a sort of quack manner to obtain power by foretelling events. Many of these impostors were very like the learned Irish prophet set forth in Hibernian verse, who knew every event before it happened after it took place. Science simply means knowledge of any subject—its nature and operation; and whoever knows most of any branch of knowledge, and can apply it in the best manner, is the most scientific in that branch. Knowledge means truth, as there can be no knowledge based upon fiction. A man, however, may perform a mechanical or chemical operation in a very superior manner and yet not be scientific. A parrot can speak, but a parrot is not a linguist, nor has it any knowledge of the science of language. A man, to be scientific, should know "the why and the wherefore of the operations he performs." Mathematics is a science, but great powers of calculation afford no evidence of scientific acquisition. Some individuals, not much above the reach of idiocy, have been great calculators. Yet mathematics as a science requires a high grade of intellect and great persistency of mental effort to master. Science may be said to be a collection of facts and experience accurately arranged and properly understood. Chemistry, for example, is an art and a science, because it is a collection of the results of careful experiments. Geology is simply a collection of facts carefully arranged. A theory is not a science; it is simply the explanation of phenomena. Every science has, according to Max Muller, first an empirical stage, in which facts are gathered and analyzed. After this they are classified or arranged, and according to the inductive method, theory explains the purpose or plan of the whole.

THE POWER OF STEAM.

If water were heated in a confined space to 1,212° Fah., it would flash instaneously into steam when exposed to the atmosphere. In the use of steam as a substitute for powder for discharging projectiles in the famous steam gun of Perkins, the water was heated to 1,212° Fah., then conveyed so as to act upon the shot with all its concentrated expansive energy. Below a temperature of 1212° Fah., the evaporation of heated water is not instantaneous, and it gradually decreases until it reaches the freezing point. Specific heat is the measure of the intensity of its force, just as the intensity of mechanical force is measured by the pressure of water forced into a vessel by the hydrostatic press. It is not the quantity of water or size of the pump that forms a measure for the intensity of mechanical force, but the pressure. A strong vessel may be burst by a pump forcing water through a tube no larger than the stem of a tobacco pipe, just as surely as with one ten inches in diameter. The force which is indicated by the pressure of a vapor or gas, is the true measure of the energy capable of producing motion or work in an engine, or in discharging projectiles from guns. Heat is undoubtedly held to be the force, but it is only available in producing motion as a motive power when applied to an expansive agent.

A remarkable instance of the destructive energy of pure steam as an expansive agent is related in the report for September last, of Mr. Fletcher, the chief engineer of the Manchester (England) Association, for the prevention of steam boiler explosions. A large hay-stack boiler, intended for a chemical establishment, was being tested with steam, at 50 lbs. pressure on the inch, not produced from water in the boiler and heated by a furnace underneath, but supplied by a pipe from another boiler. The boiler to be tested was laid upon its side, and six men were engaged upon it caulking its seams, when it exploded, the bottom being blown out entire and thrown upon the roof of an adjacent building at a distance of thirteen yards; and four of the men engaged upon it were thrown to a distance of forty yards, upon the roof of another building, one of them being instantly killed. We have never heard of another such explosion. In this case the pressure of steam was but fifty pounds on the square inch, and no extra heat or pressure could be supplied; yet a great boiler, the plates of which were from seven-sixteenths to half an inch in thickness throughout, was torn in pieces, and some of the parts weighing several hundred pounds, thrown to a considerable distance. The boiler was 11 feet in hight, 8 feet 9 inches in breadth at the base, and 7 feet 9 incnes at the waist, When it is taken into consideration that at 50 lbs. pressure on the inch, this amounts to 7,200 lbs. on the square foot, some idea may be formed of the great amount of force that was confined in that boiler.

CURRENCY—MONEY.

The currency of the world includes many kinds of money. Gold, silver, copper, iron, in coins or by weight—stamped leather, stamped paper, wooden tallies—shells of various kinds—pieces of silk or strips of cotton-cloth, of a fixed size and quality—are, or have been, all in use among mankind as forms of currency, as convenient or negotiable forms or representatives of property. Many of these kinds of money are simultaneously in use in the same country. Gold, silver, copper and stamped paper co-exist as different forms of money in the currency of Europe and America; gold, silver, copper and shells in India; silver, copper and pieces of silk in China; copper, cotton-strips, shells and the silver dollar in various parts of Africa. Sparta had a currency of iron. There is ample variety in the substances out of which money is made—metal, shells, cloth, leather, paper; and moreover, every country shapes the substances, or such of them as it uses, in a different form from the others. The generic quality which constitutes money is manifestly something extrinsic to these substances—some quality superimposed upon or attributed to them, or at least to the shape they assume as currency. Gold coin is not money in China, it is silver. In England silver is not a legal tender, save to the extent of forty shillings in payment of debt. Above that amount it is simply bullion: it is no more money than brass or tin or platinum is. Half a dozen kinds of silver coin are current at Shanghai—five kinds of the dollar and the Indian rupee; but a few years ago only one of these coins, the old Spanish Carolus dollar, was a legal tender. This state of matters was remedied in the autumn of 1855.

The States of Europe have in some respects almost become a commonwealth, but the currency of one State will not circulate in another. The English sovereign, indeed, is readily taken in payment in some

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parts of the Continent; but even it does not circulate —no more than Napoleons will circulate in England. Although the coins of one country will not circulate in another, gold and silver are recognized as the raw material of money all over Europe and America, and are valued accordingly; but paper money out of its own country, may be said to carry no value at all. Bank of England notes, indeed, which have the same prestige over all other kinds of paper money which the sovereign has over other coins, may be used without difficulty in Paris, and at no greater charge than is made for converting sovereigns and half-crowns into French money. But even in the same country there is often a limitation to the circulation of some kinds of money. The sovereign, though a legal tender and readily accepted when offered in payment, hardly circulates in Scotland—the Scotch preferring paper money, as the most safe and convenient form of currency, and also as the cheapest. Scotch bank-notes, again, are not a legal tender in other parts of the kingdom. In England, too, there are many provincial banks, the notes of each of which circulate readily in the districts where the issuing banks are situated, but are looked upon with suspicion elsewhere; they will not circulate widely, simply because they are a kind of money with which the public at large are not familiar, and in which, accordingly, they have no confidence.

The English provincial banks are very much like the State banks in America. Of all forms of money silver is the most widely recognized, and, therefore, holds the first place in the currency of the world. It is the standard money of China, with a population of 400,000,000, and of India, with a population of 160,000,000. It is also recognized as money all over Europe and America. Gold, at present, holds the second place in the currency of the world. But unless new silver mines are found, the recent discovery of the gold deposits in California and Australia will make gold more abundant and more cheap, and tend to wrest all supremacy from silver and give it to gold—by inducing the European and American States to make all the necessary additions to the metallic portion of their currency in the latter metal. Next in amount of circulation to gold and silver money, comes paper, issued under legal restrictions. In England, France, Austria and Russia, the amount of paper money in circulation is very large, but not so large in proportion, at present, as in the United States. Paper money has the widest range in value of all kinds of money. It is also the cheapest and most portable. In the form of bills of exchange—which, however, are not a legal tender—paper money plays the most important part of all, in carrying on the commerce of the world. It may also be used as a substitute for all kind of money—if under proper restrictions, with perfect safety and great economy. And in modern times it has always been had recourse to, with more or less prudence and advantage, by nations who in exceptional times find themselves in a temporary deficiency of metallic money. It should never be forgotten that money is a mere medium for the exchange of useful and necessary products.

REBEL SUBMARINE BATTERY.

The rebels have built a new submarine vessel at Mobile, with the intention of sinking and destroying any of our ships that may be lying there. The battery contains nothing new in its construction or principle, but is the same thing that has been used here several times for more peaceful purposes. Many years ago a submarine vessel, similar in all respects except the shape, to the rebel affair, was built at one of the iron-works on the East river, this city. The rebel battery sinks by letting water into certain compartments, and rises again by pumping it out; she has a horizontal projecting flange at the bow; which can be turned up or down so as to deflect the course of the vessel to the surface or the bottom of the channel; and she has also pumps for compressing air, so that the crew can remain below the surface for some time. The battery is also to carry torpedoes united by a chain, which are to be carried under the ship to be destroyed and there set free, when it is supposed they will be light enough to rise to the surface and hug the ship to be blown up—a most transparent absurdity. The rebel vessel has also a screw, which is driven by an engine as usual. This ship may accomplish the destruction of some of our vessels, and is in any case a disagreeable customer which should be got rid of as soon as possible.

OF PRECIOUS STONES.

From time immemorial jewels have been in request for all purposes, but principally for personal adornment. For some, diamonds have superior attractions: to others the gems of lesser note, such as sapphire, ruby, emerald, beryl, topaz, &c., have charms which cannot be excelled. In this, as in most other matters of similar importance, individual taste is probably the guide in selection; and while a love of display may incite some to become the possessors of costly stones, there are more who are attracted solely by the intrinsic beauty and fire of the particular jewels they affect.

It is well known that diamonds of extraordinary size and water are highly valued, chiefly in proportion to their colorlessness and freedom from specks or flaws; some of these stones—the first of all jewels—are in the possession of royal families, and are handed down in regular succession to the occupants of the thrones. Diamonds are the hardest of all known substances; they are the adamant spoken of in Scripture, and possess a brilliancy and luster unapproachable by other jewels. So much has already been made public concerning diamonds that we do not propose to pursue the subject further, but will say a few words upon some other less valuable but yet beautiful gems.

The bright red stone so much worn of late years, "carbuncle," is in fact a garnet, or a variety of that stone. To the ancients this stone was well known, and from them it received the name of "carbunculus;" it has been found in rivers abroad and is cut in various styles. The color is blood, cherry, or brownish-red, but has often a bluish or violet tinge; the red garnet can be attacked by a file. It becomes electric with friction and grows darker when heated, but resumes its color when cool. Under the blow-pipe it fuses into a black pebble. Its chemical constituents are silica, alumina and the protoxides of iron and manganese. Different names are given to the various shades of color seen in this stone, such as the Syrian garnet, when the gem is of a blood-red hue; Ceylonese garnet, when of a wine-red or orange-yellow; and Vermeille, when of a deep shade of orange-yellow. The precious garnet is of a brownish-red color, and transparent; it is found in Brazil, India, Greenland, Sweden, Norway and Spain; and nearer home, in North Carolina, Massachusetts, Georgia and New Hampshire; also in the Tahgonic range, Berkshire county, Mass.; it has likewise been found in Marlborough and Chesterfield, Mass. The garnet is cut on a leaden disk, like the face-plate of a lathe, either by the aid of emery or its ow powder, and is polished with rotten stone and the oil of vitriol, on a block-tin plate. The technical name of the oval form in which the garnet is cut, is called "cabochon." The stone is also cut like a brilliant—that is, with angles or facets on its face and bottom. Very often garnets are excavated or hollowed out on the bottom: in this way they are rendered much more brilliant; they are also backed with gold or violet foil, in order to highten their beauty. Small garnets are worked up on a large scale in factories; they are sometimes drilled with a diamond at the rate of one hundred and fifty per day. One man can cut about thirty garnets "brilliant" in a day; the polishing is done by women and children. The garnet is usually set in rings, necklaces, pins, &c., and even snuff-boxes are made from large and fine specimens, obtained in Greenland, Syria, &c. The value of the stone is determined by the size and color, as also the degree of perfection belonging to it. On account of its deep color it must be cut thin, and any stone of this variety which retains its high color without being cut too thin is valued highly and ranks with the sapphire. They are generally sold at wholesale by the pound, at from $8 to $10, containing from sixty to four hundred stones; a set of one thousand of the best selected garnets being worth about $60.

THE FORTHCOMING SANITARY FAIR.

The good work which the loyal people of the country have taken in hand—recruiting the finances of the Sanitary Commission by a series of magnificent fairs—is progressing rapidly in this city and Brooklyn; it having been determined to get up one in each city, which shall surpass all previous efforts of the kind made elsewhere. The principal objects of attraction are contributed free of cost, and are to be sold at the highest cash price possible to obtain. A patriotic inventor, who has one of the neatest clothes-dryers we have seen in a long time, and which is shortly to be illustrated in the Scientific American, has suggested that he intends to give half a dozen of his dryers to the fair; and he thinks that we should call the attention of inventors generally to the subject, so that all who feel disposed might send in their contributions in time. We do so, cheerfully; and we suggest that those of our readers who have articles to donate for the benefit of this most laudable object should forward them to this office (*charges prepaid*, and marked "For the Sanitary Fair"), whence they will be delivered to the proper authorities at the right time. Machines and utensils of whatever nature will be received; but those intended for domestic use or household purposes are highly desirable. We hope to see a hearty response to this appeal.

NATURE OF SUBSTANCES FOR GIVING LIGHT.

All the most common substances which are employed for producing artificial light are called hydrocarbons, being chiefly composed of hydrogen and carbon. In wax, tallow, olive and sperm oils these two substances exist in such harmonious proportions that they may be burned as tapers, or in common lamps and yield a very beautiful light. These are usually called natural agents of illumination, because they are not manufactured products. Spirit fluids, coal oil, and gas are manufactured products, because they are the result of chemical processes. In making gas from coal or oil, the hydrogen in these substances is very volatile, and is driven off by heat, but at its moment of liberation it lifts some carbon with it, and the gas thus yielded is carburetted hydrogen, its chief illuminating principle being called olefiant gas. When bituminous coal is roasted in a retort, its volatile products, after being purified from sulphur and ammonia, form the gas which is conveyed through pipes in our streets and houses. Coal is employed exclusively in all our large cities for making gas, but upon a small scale, for villages, and single buildings, such as factories, petroleum may be more convenient, and equally as cheap, but this can only be determined by experience, and we have very little of this to guide us in coming to a just conclusion respecting its employment for such purposes. There is one peculiarity connected with artificial light which is not very generally known. The white light of gas is produced by the combustion of solid particles of carbon. This is noticeable in burning common gas, which is composed of hydrogen and carbon. The former produces intense heat with a blue flame and feeble light. It simply raises the temperature of the minute particles of carbon in the gas to a glowing white heat, and these produce the light. In burning wax, tallow, common oil and petroleum, the very same phenomena take place—the highly heated particles of carbon in there substances produce the white light. The electric light, which is the most brilliant known, next to the sun, is produced by the power of an electric current raising carbon points to a most intense white heat. The Drummond light is produced by burning hydrogen and oxygen gases upon some substance, such as a piece of fine chalk, which being raised to a glowing white heat, reflects it in light.

Extraordinary Ocean Steaming.—The late extraordinary passage of the *City of New York*, Captain Kennedy, has created quite a sensation in nautical circles, and the abstract of her log, which was posted in the Exchange Newsroom yesterday, was a continual source of interest. The distances traversed each day were so great, and withal so regular, that we consider them worthy to be placed before our readers. From the day she left Sandy Hook (the 12th) until noon the following day, she steamed 254 miles; on the 14th, 330 miles; 15th, 320 miles; 16th, 306 miles; 17th, 311 miles; 18th, 321 miles; 19th, 321 miles; 20th, 318 miles; 21st, to Fastnel Rock, 254 miles, arriving at Queenstown at 11:30 in the morning of that day. The mean time of the run from New York to Queenstown is eight days nineteen hours, being the fastest ever made by any screw steamer. Great interest exists as to what time the *Scotia* will be reported off Queenstown; and many confident opinions were expressed that she would arrive there in the course of Thursday (to-morrow).—*Liverpool Mercury*, *Dec. 23.*

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week : the claims may be found in the official list:—

Tension Device for Sewing Machines.—Hitherto, in sewing machines, the operator has had no guide, whereby to determine what amount of tension the thread should have according to its number or size. The object of this invention is to supply this deficiency and provide for the adjustment of the tension with certainty, and to this end it consists in a novel combination of a perforated screw and a scale whereby the desired result is accomplished. Henry Bland, of London, England, is the inventor of the above, and further information may be obtained from Wm. Young, Foxboro', Mass.

Apparatus for Ventilating Rooms.—The object of this invention is the production of a current of air and the purification and cooling of such air in a room without any mechanical agency and without the necessity of admitting air from without. The apparatus consists of a box in which the air is first dried by passing through or over lime or other drying and disinfecting materials, and so caused to circulate upward through an ascending conduit preparatory to being cooled by cooling materials, and so caused to pass down a descending conduit, from which it is delivered in a pure state. The improvement consists in the combination of the ascending pipe or cooling surface, and the chamber for containing the drying or disinfecting material. Azel S. Lyman, of No. 212 Second avenue, New York, is the inventor of this apparatus.

Apparatus for pressing Straw Hats, &c.—This invention consists in the pressing of hats or bonnets by means of steam or other fluid at a suitable pressure acting upon a flexible diaphragm or cover applied to one side of the hat or bonnet while the other side is supported by a rigid block or form, by which means a great saving of time and labor is effected and the grain of the straw or other material of which the hat or bonnet is composed, is better preserved. It also consists in certain mechanical means of applying the above system of pressure to the above purpose. J. F. Mathias, of Paris, France, is the inventor of this hat-presser, and further information may be obtained of Messrs. C. Dord & Co. No. 51 Worth street, New York.

Hat-pressing Machine.—This invention relates to the employment of mechanical clamps for the purpose of holding the brim of the hat or the margin of the piece of felt or other fabric of which a hat is formed, and of drawing and stretching the same over the former or hat block preparatory to and during the operation of the die. Such clamps as heretofore constructed have consisted of a pair of rings or elliptic-shaped frames which have taken hold of the margin of the brim or piece all around, and these could not be used successfully in the manufacture of hats from sheets of felt and some other fabrics owing to their liability to tear the fabric, and are moreover inconvenient on account of their not being adjustable for hats of various sizes. With a view to obviate the above objection, the first part of the invention consists in the employment, in combination with the block or former and die of a hat-pressing machine, of a number of separate clamps to take hold of the felt or fabric at its corners or at suitable intervals, but not all around, thereby leaving the fabric free to be drawn inward or contract from certain points as it is stretched from other points. Other features of the invention consist in making such clamps adjustable and in certain arrangements and modes of adjusting and operating the clamps or stretching apparatus. The above invention of S. H. Lyon, of Brooklyn, N. Y., has been assigned to S. H. Lyon and R. T. Wilde, either of whom may be addressed at No. 251 Broadway, New York.

SPECIAL NOTICE.

Amasa Woolson, of Springfield, Vt., has petitioned for the extension of a patent granted to him May 28, 1850, for an improvement in machines for shearing cloth.

It is ordered that the said petition be heard at the Patent Office, Washington, on Monday, May 9, 1864.

All persons interested are required to appear and show cause why said petition should not be granted. Persons opposing the extension are required to file their testimony in writing, at least twenty days before the final hearing.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JANUARY 19, 1863.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

41,268.—Flyer for Spinning Machines.—John H. Aldrich, Holyoke, Mass.:

I claim constructing the cam or stop and presser arm of slubber and speeder flyers in one piece, with the stop close to the under side of the lower ear of the flyer, and having a hole to receive the squared ends of the pin, thus preventing too great strain upon the pin, and admitting of greater nicety of adjustment, as herein described.

41,269.—Water-Closet Valve.—F. H. Bartholomew, New York City :

I claim combining with a pan water-closet, a supply valve, R, for admitting water into a pan, balancing diaphragms, E H, and a regulating chamber, Z, for controlling the motion of the valve, the whole being constructed and arranged substantially as shown in Fig. 1, of the accompanying drawings and for the purposes described.

41,270.—Horse Rake.—Lorenzo Beach, Montrose, Pa.:

I claim in combination with the upright lever, L, the horizontal lever, B, and spring bar, S, operating substantially in the manner described.

41,271.—Cheese Curd Cutter.—Horace A. Blakeman, Cuyler, N. Y.:

I claim the frame, c, and knife, d, driven as represented, in combination with the box, e, in the frame, f, operated by the dog and ratchet, or their equivalents, when used as and for the purposes set forth.

41,272.—Tension Device for Sewing Machines.—Henry Bland, Luton, Kingdom of Great Britain :

I claim the tension device composed of the screw, B, and scale, C, combined substantially as and for the purpose herein specified.

41,273.—Grain Dryer.—Caleb H. Booth, Dubuque, Iowa:

I claim the combination of the conveyer, C E, with steam heated reservoir, A B, enclosing it, all constructed substantially as shown, and by means thereof with steam to bleach, to purify and to dry flour and meal, but no other substance.

41,274.—Lantern Dinner Pail.—Clarissa Britain, St. Joseph, Mich.:

I claim, first, A lantern dinner pail constructed and operating substantially as and for the purposes described.

Second, The combination of the lamp chamber, C, flue, c', partition, c, and upper receptacle for pans, d e, arranged within the pail, a, substantially as and for the purposes described.

Third, Constructing the cover of a dinner pail with a flue, h', in combination with a flue extending down to the chamber, C, substantially as and for the purposes described.

Fourth, The combination of the removable bottom pan, B, lamp chamber, C, and one or more heating chambers, d e, substantially as and for the purposes herein described.

41,275.—Fiber from Flax, Hemp, &c.—Hugh Burgess, Rogers Ford, Pa.:

I claim a fiber suitable for textile purposes, made from hemp, flax, and other fiber-yielding plants, by boiling them in an alkaline solution under pressure, substantially as described.

41,276.—Disintegrating or Cottonizing Flax, Hemp, &c.—Hugh Burgess, Rogers Ford, Pa.:

I claim the mode of producing fibers for textile purposes from flax, hemp, and other fiber-yielding plants, by the action thereon of caustic alkaline solution at a suitable temperature, substantially as described.

41,277.—Lathes for turning Spherical Shapes.—Robert B. Carsley, New Bedford, Mass.:

I claim the combination of the two disks, D E, rotating in opposite directions, and the annular cutter, j, substantially as and for the purpose herein specified.

[This invention consists in the combination of two disks rotating in opposite directions about the same axis and a circular or annular cutter arranged between the said disks. The ball is placed between the disks and set in motion by the friction thereof, and the cutter reduces it to true spherical form.]

41,278.—Construction of Ships of War.—Henry Cardwell, Oatlands House, Shillingford, England. Patented in England April 10, 1863 :

I claim, first, The corrugated armor-plated roof having the port-holes in the corrugations, d d, substantially as herein specified.

Second, The port shutters composed of a number of separate plates of iron or steel, e e, arranged one above another and fitted to grooves in the edges of the armor-plates, to operate substantially as herein specified.

Third, The employment of india-rubber or other elastic material in combination with the circumscribing lip of the vessel, substantially as herein specified.

[The chief object of this invention is so to construct ships of war that they shall possess ample facilities for the working of broadside guns, while at the same time effectual protection is afforded to the crew and also to the hull of the ship, access to the upper deck by boarders being provided against it.]

41,279.—Mode of Coloring Kid Gloves, &c.—Samuel C. Chase, Charlestown, Mass.:

I claim my improved process substantially as above set forth, for treating and coloring kid skins or kid gloves.

41,280.—Ruffle.—C. O. Crosby, New Haven, Conn.:

I claim as a new article of manufacture the within-described ruffle, when the binding is turned under as described, and the frill and binding secured together by two rows of stitching, substantially as specified, whether the edge of the frill under the binding is turned over or not.

41,281.—Breech-loading Fire-arm.—Frederick Curtis, Newton Lower Falls, Mass. Ante-dated Jan. 2, 1864 :

I claim in combination with the trigger and the movable guard or lever of the breech block, a trigger-locking mechanism, which by an upward movement of said lever toward the trigger plate and by other means or devices shall be unlocked from the trigger, and while the lever may be depressed or forced away from the trigger plate, and for the purpose of lowering the breech block, shall lock or bolt the trigger, and thereby prevent accidental discharge of the fire-arm.

I also claim the peculiar mechanism for operating the bolt, m, the same consisting of the arm or retractor, I, and the spring, w, for their mechanical equivalents, such being arranged with respect to the trigger bolt, m, and the guard lever, C, so as to operate and be operated in manner and under circumstances substantially as specified.

41,282.—Artificial Leg.—Phylander Daniels, Le Roy, N. Y.:

I claim forming the socket, A, for the reception of the natural thigh, when amputation is above the knee, of sole leather or other thick leather of sufficient thickness to be self-supporting, and not requiring a skeleton frame, and so arranged that its flexibility will allow it to yield and adapt itself to the form of the natural member within, so as to secure ease to the wearer; said socket being used in combination with the block, B, or its equivalent, for forming the knee joint, substantially as herein set forth.

Second, I also claim the knee-joint, composed of the thin plates, D D, resting in the grooves, c c, and connected by the axis, i, substantially as herein described.

Third, In combination with the parts thus forming the knee-joint, the concentric slots, h h, and bolt, i, arranged substantially as herein specified.

Fourth, I also claim the arrangement of the lateral hinges, s s, axis, r, and its socket, t, in combination with the foot, H, and inferior leg, C, substantially as and for the purpose herein set forth.

41,283.—Stone Gatherer.—Wm. H. De Groot, New York City :

I claim, first, The revolving cylinder driven by the main wheels of the machine, provided with pickers, c, and sieves, d, constructed and operating substantially as and for the purpose set forth.

Second, The construction of the revolving pickers, c, as described, in combination with the ring, l, and flange, m, for adjusting the parts simultaneously, as and for the purpose set forth.

Third, The arrangement of the receiving box, e, provided with the lifting back, j, and guiding hooks, i, constructed and operating as and for the purpose set forth.

41,284.—Manufacture of Coffins and other articles from Asphaltic Compositions.—Drake W. Denton, Ithaca, N. Y.:

I claim, first, The use of the material or composition made as described, in the manufacture of coffins and burial cases and air-tight coffins.

Second, I claim the herein-described mode of making my materials for coffins and other useful articles from the several materials mentioned.

Third, I claim the herein-described mode of molding coffins and other articles by means of plate or patterns, or molds made of sheet steel or other metal, that by its elasticity cleaves off of the coffin or other article made in the manner described, and the securing of a polished glossy finish to the coffin or other article, without hand polishing or finishing by means of polished elastic plates, as described.

41,285.—Building Flumes for Floating Logs.—John Du Bois, Williamsport, Pa.:

I claim, first, Providing for the passage of water under the flume, A, and into the flume, A, at the points where the flume crosses streams, substantially as and for the purpose described.

Second, I claim a log-floating flume constructed with an under and overflow channel and gate, arranged over a stream, substantially as and for the purpose set forth.

41,286.—Composition for Pasting Cops.—James Dunkarley & John Knight, Paterson, N. J.:

We claim a composition produced by mixing the within-described ingredients together, substantially in the manner and about in the proportions herein specified.

[The object of this invention is a composition for fastening the lower ends of cops, so that they will not loose their shape or become tangled when removed from the spindle.]

41,287.—Grubbing Machine.—J. H. Flanagan, Chicago, Ill., and Wm. Laning, Stoughton, Wis.:

We claim, first, The employment of the grooved plate, E, in combination with the clevis, F, and pin, c, for the purpose of adjusting the machine to stumps of different sizes, substantially as herein described and shown.

Second, The combination and arrangement of the circular fulcrum, A A, the lever, B, clevis, F, and grooved plate, E, constructed and operating as and for the purposes herein shown and specified.

41,288.—Metallic Pontoon Wagon Boat.—Joseph Francis, New York City :

I claim combining and arranging pontoons formed of two parts, substantially as described, with the staples and bars, S, and windlass apparatus or its equivalent, for holding the balks, by which the pontoons are united and formed into a bridge, by which combination I form a light and portable pontoon bridge easily laid down and taken up with a small body of men and which can be transported with safety and rapidity as herein fully made known.

41,284.—Centering Heavy Articles in Lathes.—John S. French, Boston, Mass.:

I claim, first, The hollow spherical journal for the purpose set forth.

Second, Combining with the spherical journal a means for lateral adjustment of the same with respect to the article to be turned or bored, substantially as described, for the purpose of bringing the center of the journal into the axial line of the said article, as specified.

41,290.—Hand Loom.—John G. Garretson, Salem, Iowa:

I claim, first, In a loom operated by one treadle only the connecting the lay and treadle together by a link, in such a manner that the back and forward motion of the lay will impart to the treadle a positive up and down motion suited to the purpose of elevating and depressing the harness properly in making a shed in the web for the shuttle to pass through in weaving.

I also claim the combined action of the roller and pendants as above described for the purpose of changing the shed, in such a manner as to produce either plain or twilled goods, and to be used either in hand or power looms.

41,291.—Pump.—John G. Garretson, of Salem, Iowa :

I claim the joint formed by the parts f and g, with the links, i i, Fig. 1, in the position shown in the drawings when acted on by the handle H (Fig. 1), and made to move the pipe, D, alternately from side to side of the pipe, C, and with the partition, e, forming a continuous tube for conducting the water from the bottom of the cylinder to the top of the well, making a double-acting force pump without valve or cut-off.

41,292.—Button.—P. W. Gengembre, of Boston, Mass.:

I claim the combination of the tube or spring, D, with the button-body, A, and a locking catch or mechanism made and applied to the button, substantially in manner and so as to operate as specified.

41,293.—Railroad Support.—B. F. Gossin, of Cincinnati, Ohio :

I claim the shouldered jaws, D D, constructed with extensions, in combination with the plate, B, and keys, F F', support, E, and key, F'', all arranged and operating substantially as and for the purpose described.

41,294.—Molded Cloth and Paper Collar.—Solomon S, Gray, of Boston, Mass. Ante-dated Jan. 17, 1864.

I claim, as a new article of manufacture, a cloth and paper shirt collar "struck up" or pressed from a flat piece into any desirable form, substantially as described and for the objects specified.

41,295.—Suspender.—B. J. Greeley, of New York City:

I claim braces formed by the connection, in the rear, of the descending and the ascending portions, substantially as herein shown and described.

41,296.—Screw Power.—Jacob Haege, of Shiloh, Ill.:

I claim the employment or use, in a screw power, for elevating or fitting purposes, of journals, d, applied to nuts, C' C'' C''', in which screw rods D D' D'' are fitted and work, in combination with the pivoted bar, B, and bearings, c, all arranged to operate substantially as and for the purpose set forth.

[This invention consists in a novel arrangement and application of the screw and nut for elevating or lifting purposes, whereby the screw is allowed to adjust itself to its work and thereby avoid much friction hitherto attending the operation of the screw when applied to such purposes.]

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41,297.—Machine for manufacturing Flyer Guides.—D. L. Hill, of Lowell, Mass.:

I claim the above-described machine or combination, consisting of the feed rollers, (A B), (or machinery by which the wire is fed along or delivered with an intermittant movement and held firmly while its reduction is in the act of being effected), the cutter mandrel, M, and its cutter head, n, and one or more cutters, o (or machinery for turning down or tenoning the wire, substantially as described), the shear, R, and its plate (S) (or machinery for separating from the wire the part to constitute the guide blank), and finally the cam, o, groove, p, lever, n, and spring, P, or mechanism for producing the advance or retreat of the mechanism or cutters, by which the tenoning of the wire or blank is effected, the whole being to operate substantially in the manner and for the purpose as hereinbefore described.

41,298.—Pump.—Hiram Hosick, of Paris, Pa.:

I claim having the end of the pump lever made in the form of a semi-circle, G, when combined with the cords, H H, and piston rod, E, in the manner herein shown and described.

[This invention relates to an ingenious mode of operating the piston of the pump, whereby a longer stroke of the piston is obtained than by the ordinary brake or lever, and a proportionably greater quantity of water elevated within a given time and with greater facility or a less expenditure of power.]

41,299.—Gas Engine.—Pierre Hugon, of Paris, France:

I claim the improved machinery for obtaining and applying motive power, hereinbefore described and illustrated in the accompanying drawings.

41,300.—Coal Oil Lamp.—J. G. Hunt, Cincinnati, Ohio:

I claim the inner air passage, C, surrounding the flat wick tube, c, in combination with an outer conical air conductor, A G, extending from the flame of the lamp downward around the bowl of the lamp as specified, when these several parts are constructed, arranged and operated as and for the purpose set forth.

41,301.—Concentrated Feed for Horses, &c.—George Jaques, of Summerville, and D. F. White and John Stowell, of Charlestown, Mass.:

First, We claim preparing a concentrated nutritive food for animals, in the manner substantially as set forth.

Second, We claim also, as a new manufacture, a package for feeding animals, composed of nutritive material such as herein described, compressed and inclosed in a water and air-tight covering, substantially as set forth and described.

41,302.—Lubricator.—A. J. Judge, of Baltimore, Md. Ante-dated, Jan. 17, 1864:

First, I claim the comb nation of reservoi as described (Fig. 1), with the air chamber and the inner tube, as shown in Fig. 3, in the manner and for the purpose herein specified.

Second, The application of an inner tube or pipe passing up through the center of oil into the air chamber above, said tube to be open at top and closed at the bottom, with a passage on the side, or through a small pipe in the center for the oil to come down without entering the air chamber, as fully shown at C, Figs. 2 and 3.

41,303.—Eyeleting Machine.—Jeremiah Keith, of New Bedford, Mass.:

I claim the arrangement of one or more directing ports or passages, in manner substantially as described, with the hopper and chute of the eyeleting machine.

I also claim a combination consisting of the following elements, viz: The eyelet pin; a mechanism for feeding the eyelets to the pin; a mechanism which will perform the functions of holding the eyelet pin down while an eyelet is being fed upon the pin anvil, and subsequently operating to elevate the eyelet pin or effect its elevation through the eyelet as specified.

41,304.—Railroad Jack.—Michael Kelly, of Philadelphia, Pa.:

I claim the within-described jack composed of the nut or plate, a, the legs, b, plates, c, secured to the same, the screw, D, swivel, n, and jaws, P, when the said plates are arranged to rest on the ground between the cross-ties, one plate on each side of the rail, and when the whole is otherwise constructed as and for the purpose herein set forth.

41,305.—Boots and Shoes.—Oliver Lafrenier, of New York City. Ante-dated Jan. 17, 1864:

I claim a boot or shoe, with a flanged heel plate, D, wooden heel, C, flanged sole plate, G, tip, H, protecting lugs, I I', tapering nails, J, plugs, e, and wooden soles, E, all combined in the manner and for the purpose herein shown and described.

And I also claim the employment or use, for the purpose of securing a wooden heel to boots and shoes, of the flanged plate, D, with tacks or screws passing through holes in the flange and into the circumference of the heel as specified.

Also the employment or use, for the purpose of fastening and protecting a wooden sole, E, of a tip, H, and legs, I I', secured to the inner sole of the boot or shoe, and provided with holes to admit of inserting tacks or screws into the edge of the wooden sole, as shown and described.

[This invention relates to the means employed for the purpose of fastening wooden heels and wooden soles to boots and shoes.]

41,306.—Machine for Straightening Metal Bars, Rails, Tubes, &c.—Bernard Lauth, of Buchanan, Pa.:

I claim the employment of a double set of rollers, the centers of one set being placed between the centers of the other set, substantially in the manner and for the purpose herein set forth.

41,307.—Roll for Rolling Metal.—Bernard Lauth, of Buchanan, Penn.:

I claim the combination of the "three high rolls," A B C, of which one (B) shall be of less diameter than the other, substantially as and for the purpose herein described and represented.

41,308.—Car Coupling.—J. T. Lowrey, of La Fayette, Ind.:

I claim, first, The combination of the pin, D, and the pivot-rod, E, in their said arrangement in a railroad car bumper and for the purposes set forth in the foregoing specification, viz, the production of a self-adjusting coupling.

Second, Also the cuts, F and H, in the bumper and in combination with said pin and pivot-rod, whereby said pin obtains room to swing.

Third, Also the groove, G, in the interior of the bumper and in its combination with said pin and rod; which groove, by being narrower than the link chamber beneath it, keeps the link from rising unduly, and thus keeps it in its horizontal position.

Fourth, Also the rubber in said groove, G, as assisting the pin in recovering its perpendicular.

41,309.—Apparatus for Purifying and Cooling Air.—A. S. Lyman, of New York city:

I claim the combination of the ascending conduit, D, and cooling surface, n, or its equivalent, with a chamber, B, containing drying or disinfecting material, substantially as and for the purpose herein specified.

41,310.—Auto-propelling Horse and Vehicle.—P. W. Mackenzie, of Jersey City, N. J.:

I claim, first, The direct connection of a rigid auto-propelling horse or other seat for a rider, in combination with a cranked shaft with two or more centers.

Second, The stirrups, b, or foot rest, arranged direct on the crank pin or shaft opposite the one on which the body rests, in combination with the cranked axle and body.

Third, The direct connection and arrangement, by means of the rods, g g, of the bit, c, with the steering wheel or wheels behind, in combination with the cranked axle and body.

41,311.—Pressing Hats.—J. F. Mathias, of Paris, France:

I claim, first, The pressing of hats by steam or other fluid acting upon flexible diaphragms, in the manner substantially as herein shown and described.

Second, The combination of the block, C, block cover, D, flexible diaphragm, E, and lever, G, substantially as and for the purpose specified.

41,312.—Paper Reel for Telegraph.—Henry McGann, of Cleveland, Ohio:

I claim the herein-described arrangement of the mutually-exchangeable reels, D and F, in combination with the gears, J J', cord, I, pulley, L, and weight, H, the several parts being constructed, arranged and operating, as and for the purpose herein set forth.

41,313.—Hand Loom.—S. C. Mendenhall, of Richmond, Ind.:

I claim the application to hand looms of shaft, E, with its supports, g S, crank, W, and pinions, X, or their equivalents, when the same are used in combination with shaft, D, for the purpose of placing the operator in front of the loom.

41,314.—Cultivator and Seeder.—C. E. Miller, of Amelia, Ohio:

I claim, first, the provision of separate clod-crushing rollers, B B', having their middle tiers of studs, D', adapted for removal when the implement is required for tilling young crops, as herein explained.

Second, the device or attachment, H H' H'', arranged and adapted as and for the several purposes set forth.

Third, In the described combination I claim the pair of armed rollers, B B', provided with removable studs, D', clearing teeth, E, and sod-cutter or rake, H, having removable blades, H, for the purposes of cultivation, as set forth.

Fourth, The described combination of clod-crushers, B, B', clearing and cutting teeth, E, and H' H'', and clevis, N O, the whole being arranged and adapted to operate either with or without a seed depositing apparatus, as set forth.

41,315.—Wagon Brake.—S. H. Miller and Edmund Grubb, Liberty, Ill.:

We claim the combination of the equalizer, d', and guide-bar, C, with the rear end of the sliding tongue, D, and with the break beams, F, and adjusting fulcrum bars, H, as and for the purpose herein shown and described.

[The object of this invention is to produce a brake for wheel vehicles which will operate automatically whenever the vehicle crowds upon the draught animals, and which will release the wheels as soon as a strain in a forward direction is exerted on the draught pole.]

41,316.—Boiler for Locomotives.—James Millholland, Reading, Pa.:

I claim the arrangement, substantially as described, of the fire-box with its grate depressed at one or both ends in respect to the frame, B, of a locomotive engine for the purpose specified.

41,317.—Plane.—Eli Odell, Winterset, Iowa:

I claim a plane with the adjustable face-plate, B, n combination with a concave throat, the whole constructed and operated substantially as described.

41,318.—Composition for Scouring Wool.—Anthony Peple, East Billerica, Mass.:

I claim, first, The employment or use of blubber or gurry, or the refuse of such oils containing an excess of organic matters mixed with alkalies and common salt, substantially in the manner and about in the proportion herein specified.

Second, The application of blubber or gurry in combination with alkalies, when the same are mixed together or added singly to the scouring liquor, as set forth.

Third, The employment or use of common salt in combination with blubber or gurry and alkalies, substantially in the manner and for the purpose described.

[This invention consists in the employment or use of blubber or gurry, being the refuse of cod livers or sediments of fish oils or of other oils containing an excess of organic matters either alone or mixed with alkalies and common salt for the purpose of scouring wool or other fibrous materials previous to spinning and weaving, or for scouring textile fabrics, particularly goods made wholly or partially of wool.]

41,319.—Feed-water Heater for Locomotives.—David Pollock, Lancaster, Pa. Ante-dated Jan. 17, 1864:

I claim, first, One or more circulating chambers in combination with the tank and heaters, substantially as and for the purpose set forth.

Second, I claim the tubular bars or grates, G G, in the furnace or fire-box in combination with one or more circulating chambers for heating the feed water, substantially as set forth.

Third, I claim one or more pipes, K K, attached to the fire-grate heater and extending above the grate as herein described for the purpose set forth.

Fourth, The valve, M, with the float, Q, attached, in combination with the circulating chamber, tank and heaters, substantially as and for the purpose herein described.

Fifth, The pipe, V, with the stop, W, arranged as shown for the purpose specified.

Sixth, I claim combining with the heater, G G, in the fire-box, the safety valve, U, for the purpose herein set forth.

Seventh, The heater, H H, in the smoke box, constructed with the circular pipes, substantially as shown and described.

Eighth, I claim the reheating pipe, N N, constructed as and for the purpose specified.

Ninth, I claim the hose or pipes, F and L, in combination with the tank, heaters and circulating chamber as and for the purpose described.

41,320.—Harness Breast Strap Slide.—M. W. Pond and L. W. Darling, Elyria, Ohio:

We claim the metallic shield having its curved diverging projections and being secured firmly to a suitable loop of leather, for the purpose of protecting the breast strap of harnesses from the chafing and cutting of the rings of the neck yoke, the whole being constructed and arranged in the manner substantially as set forth.

41,321.—Broad-cast Seed-sower.—J. R. Rogers, Berlin, Wis.:

I claim the construction of the bottom of the percussion wheel, G, so as to close only the inner portion of the same around the shaft, and have narrow ledges, u u, at the sides of the wings the remainder of the radial distance to the periphery of the wheel, substantially as and for the purpose herein specified.

I also claim the construction, arrangement and combination of the sliding gate, D, spring, E', latch, L, and adjustable graduated catch, M, substantially in the manner and for the purposes herein specified.

41,322.—Churn.—D. K. Price, Ossian, N. Y.:

I claim the arrangement of the reciprocating dashers, D D, made inclined for the purpose of throwing the cream forward through the partition, and provided with holes, h h, in the rear, for throwing the cream backward when it is raised—the central perforated wire partition, B, for thoroughly breaking the cream, and the adjustable elbows, H H, for increasing the length of the stroke, without increasing the vibration of the lever, when the said parts are combined with the box, A, lever, I, and standard, K, substantially as herein set forth.

41,323.—Steam Boiler.—R. E. Rogers and James Black, Philadelphia, Pa.:

We claim, first, The body, A, of the boiler, having tubes, B and B', so arranged that they will maintain a continuous circulation of water between the upper and lower portion of the boiler, when the whole or very nearly the whole of the boiler is suspended within a casing containing the fire chamber, and is exposed to the direct action of the products of combustion, as set forth.

Second, Two or more sets of tubes, B and B', arranged on and attached to the body, A, of the boiler as set forth for the purpose specified.

41,324.—Machine for Washing Wool.—C. G. Sargent, Graniteville, Mass.:

I claim in combination with the bowl or tub, b, a lifting cylinder, composed of an inner and outer cylinder, or their equivalents, whose shafts or bearings are eccentric with each other, and arranged to operate substantially as herein represented.

I also claim the lifting cylinders, j k, in combination with the carrying rolls l l, substantially as and for the purpose described.

I also claim in combination with the squeezing rolls, m n, the fan, g, for taking, beating up, and throwing the washed wool to its place of deposit, substantially as described.

41,325.—Breech-loading Ordnance.—William Schmoele, Jr., Philadelphia, Pa.:

I claim having the receiver, C, arranged to oscillate in line with the barrel, A, in combination with the guide projections, k k, upon the interior of the receiver, and the projections on the breech pin, all operating in the manner herein shown and described.

I also claim the arrangement of the pins, l m n, with the stem, g, and rear face of the receiver, C, as herein shown and described and for the purposes specified.

41,326.—Horse Rake.—D. P. Sharp, Ithaca, N. Y.:

I claim the cam-shaped lever, H, constructed as described and provided with the rod or handle, I, and the bent lever, G, connected by the cord or chain, e, the lever, G, having its lower arm, b, extending under the bar, c, of the teeth-elevating frame, E, and the lower end of the cam-shaped lever, H, connected by the cord or chain, l, with the teeth-depressing frame, F, when said parts are used in combination with the draught bar, K, and provided with the roller, L, or without it, and all arranged to operate in the manner substantially as and for the purpose herein set forth.

[This invention relates to a new and useful improvement in that class of horse rakes in which wire teeth are used. The invention consists in a novel way of connecting the draught attachment with the tooth frame, whereby the draught of the animal, by a simple manipulation on the part of the driver, is made subservient in elevating the teeth, so that the latter may discharge their load and keeping the teeth elevated a requisite period of time, and the draught of the animal also made to keep the teeth down while the latter are at work.]

41,327.—Rotary Pump.—J. H. Shedd and William Edson, Boston, Mass.:

We claim the arrangement of two fans or buckets moving on the same center within a drum, each of which is alternately held in position as a diaphragm, while the other revolves, forcing out the fluid before it and receiving fluid behind it, substantially as herein described and for the purposes set forth.

41,328.—Churn.—W. Slaughter, Westerville, Ohio:

I claim, first, The concave spiral beaters, B and D, upon a revolving shaft, in combination with the spiral ribs, F, arranged and operated as and for the purpose set forth.

41,329.—Whiffle-tree Attachment.—Ephraim Soper, New York City:

I claim as an improved article of manufacture a whiffle-tree attachment composed of plates, C C' hook, F, extension edge, d*, and tube, a, made and applied as herein shown and described.

[This invention relates to a new and improved attachment for whipple-trees whereby the bolt, which connects the whipple-tree to the double-tree or to the cross-bar of a pair of shafts or thills is protected from the pull or strain to which it is commonly subjected under the draught of the animal, and the whiffle-tree at the same time rendered capable of being turned nearly or entirely around and applied to or detached from the double-tree or thills with equally as great facility as with the ordinary bolt attachment.]

41,330.—Faucet Measure and Indicator.—Vincent Squarza, San Francisco, Cal.:

I claim the application to faucets of the gage tube, E, provided with a double scale to indicate both the quantity remaining in the vessel, as well as the quantity drawn therefrom, substantially in the manner herein described.

I also claim the measure, P, in combination with a three-way faucet, substantially in the manner and for the purpose herein described.

I also claim in combination with the measure, D, of a measuring faucet the regulator, F, for regulating the temperature of the liquid to be drawn, substantially in the manner herein described.

41,331.—Artificial Manure.—Eugene Von Nordhausen, New York City:

I claim the production of artificial manure from the residuum of coal oil or petroleum, substantially as described.

41,332.—Washing Machine.—Richard Washburn, Monsey, N. Y.:

I claim the double notched bridge tree, C, in combination with the standard, B, hinged oscillating concave, E, and oscillating tub, A, all constructed and operating in the manner and for the purpose set forth.

Also hinging the concave, E, to the lower ends of the oscillating arms, D, as described, so that the same will readily accommodate itself to the surface beneath, and also be free to rise and fall.

[This invention is intended as an improvement on that class of washing machines in which an oscillating semicircular concave is used, which swings in a direction opposite to an oscillating semicircular tub, the clothes being exposed to the action of the outer surface of the concave and the inner surface of the tub.]

41,333.—Spinning Roller.—William Weild, Manchester, Great Britain. Patented in England, Sep. 20, 1859:

I claim, first, The use in machines for preparing, spinning and doubling fibrous materials of rollers having their flutes arranged in a spiral form and at an angle to the axis of the roller as hereinbefore described and illustrated by the accompanying drawings.

Second, The system or mode of reversing the angle direction or curve of the flutes as hereinbefore explained and illustrated by the drawings and the use of rollers having the angle direction or curve of the flutes so reversed.

41,334.—Trace Fastener.—F. M. Weller, Evanston, Ill.:

I claim, the hook, A, provided with the stationary anterior and posterior projections, a a', constructed and arranged substantially as and for the purposes herein set forth and described.

41,335.—Lubricator.—D. M. Weston, Boston, Mass.:

I claim the centrifugal oiling apparatus composed of the cups, B and C, and the pipe, D, arranged with respect to the shaft, A, and its bearing, b, substantially in manner and so as to operate as described.

41,336.—Machine for Handling Hides.—J. S. Wheat, South Wheeling, West Virginia:

I claim the employment or use for the purpose of handling hides or skins of one or more paddles, C, secured to an arm, D, which is suspended from a spring bar, E, or its equivalent, and derives its motion from a crank-shaft, F, or its equivalent, substantially in the manner herein shown and described.

[This invention consists in the employment or use for the purpose of handling skins and hides of one or more paddles suspended by an adjustable arm from a spring bar over a tank containing hides or skins and tanning liquor or lime bath, and connected to a crank shaft in such a manner that by the combined action of the spring bar and crank shaft a reciprocating rotary motion is imparted to the paddle and thereby the liquor and hides or skins in the vat are caused to revolve over and over, and the hides or skins are thus handled with the least possible labor or exertion. For the purpose of handling an extraordinary heavy pack of hides the paddle is armed with two or more hooks which act on the hides and cause them to revolve by direct application of power.]

41,337.—Machine for Cutting Books.—Jane Austin (administratrix of the estate of F. J. Austin lately deceased), New York City:

I claim, first, The elliptical cam groove, i, in the under surface of the platform, F, in combination with the roller pin, j, and stops, k, all arranged and operating substantially as and for the purpose set forth.

Second, The gage, e', in combination with the screw clamp, G, platform, F, adjustable carriage, H, and knife, E, constructed and operating substantially as and for the purpose described.

[This invention relates to an improvement in that class of machines which are used for the purpose of cutting the faces and ends of the books, and the object of the invention is to arrange the machine so that it will clamp two sets or layers of books simultaneously, and that the faces and the ends of both sets can be cut without unclamping either set, and furthermore, that it can be readily adjusted for books of different sizes.]

41,338.—Cooking Utensil.—Thomas Godfrey (assignor to himself and Charles, Joseph and Henry Tucker), New York City:

I claim uniting the detachable part, N, of a cooking utensil with a spoon, M, or with a fork or the like, as an equivalent therefor, by a joint which may be adjusted so as to be rigid or to fold or bend freely at pleasure, substantially as herein shown and described.

41,339.—Self-relieving Hook for Boat's Tackle.—H. G Guyon, Brooklyn, N. Y., assignor to James Edsall, Sing Sing, N. Y.:

I claim as an improved article of manufacture a self-relieving boat tackle device composed of a slotted hook, A, having cheeks, f, and a flat link, B, provided with a transverse pin, e, the several parts being constructed and operating in the manner herein shown and described.

[This invention consists in a divided or slotted hook of peculiar con

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struction to be attached to the boat, and a link of peculiar construction to be attached to the tackle, whereby the tackle is made to detach itself when the boat in being lowered from a vessel in motion comes to a bearing on the water.]

41,340.—Barrel for Carbon Oils.—Barnard Hackett (assignor to Wm. G. Harden), Pittsburgh, Pa.:

I claim constructing barrels for holding carbon oil and other penetrating fluids, with a metallic body encased in wood, and head or end-pieces composed of two or more layers of wood glued together, or having a metallic lining between the layers of wood, constructed substantially as hereinbefore described.

Also making the heads or end-pieces of barrels of two or more layers of wood, set so that the grain of the wood in any one layer shall cross the grain in the other, united with glue or other cement, substantially as hereinbefore described.

Also, making a corrugation or indentation around the metallic body of the barrel near each end, for the purpose of holding the heads in place, and making a close joint, substantially as hereinbefore described.

Also placing a metallic disk between two layers of wood forming a barrel head and uniting them together with screws or rivets, substantially as and for the purpose hereinbefore described.

41,341.—Railroad Signal.—F. J. B. Hubert & F. C. A. Derocquigny, New York City:

I claim, first, The pulley, D, provided with the ratchet, F, and chain, C, in combination with the signal disk, B, suspended on a horizontal axis or shaft, substantially as herein shown and described, and all used in connection with the pawl, I, and arm, i, attached to the hub or collar, f, the arm, M, attached to shaft, J, and the lever, P, connected to arm M, and provided with the upright plate R, all being arranged to operate substantially as set forth.

Second, The arm, K, attached to shaft, J, in combination with the drop catch, N, arranged to operate as and for the purpose specified.

Third, The colored glass, S, in the signal disk, B, in combination with the lamp or lantern in an aperture, b*, in the upright, A, when operated by the mechanism as above set forth and for the purpose specified.

[This invention relates to a new and improved signal for railroads for the purpose of preventing trains from coming into collision, and also to prevent them from passing on wrongly adjusted switches, and on drawbridges when the draws are open.]

41,342.—Apparatus for Forming Hats and Bonnets.—S. H. Lyon (assignor to himself and R. T. Wilde), Brooklyn, N. Y.:

I claim, first, The employment, in a machine for pressing or forming hats, of separate clamps arranged to take hold of the fabric at the corners or at suitable intervals, substantially as and for the purpose herein deecribed.

Second, Making such clamps adjustable to suit hats of various sizes, substantially as herein described.

Third, The attachment of the upper portions, H, of the clamps to levers, I, carried by two rock-shafts, J, and operated by cam levers, K, the whole arranged in connection with the frame, D, and operating substantially as herein described.

Fourth, The arrangement of the bearings, e, of the rockshafts, J, upon the lower clamp plates, G, to serve as gages by which to adjust the upper clamping pieces, H, relatively to the said plates, G, substantially as herein described.

Fifth, Supporting the clamps upon two toothed rack-bars, E, or their equivalents, which are so jointed at their upper ends as to permit either end of the clamps to be raised or lowered at pleasure, substantially as and for the purpose herein described.

41,343.—Breech-loading Fire-arm.—E. M. Mix and H. B. Horton (assignors to themselves, John Gauntlett and John H. Selkreg), Ithaca, N. Y.:

We claim, first, The hammer, E, and trigger, F, constructed and applied in combination with each other and with the sliding breech-block, D, substantially as herein described, whereby the cocking of the hammer is effected by the agency of the trigger in the closing movement of the breech block, as herein set forth.

Second, the spring, v, and catch piece, r, or its equivalent, applied in combination with each other and with the extractor, I I′, to operate substantially as and for the purpose herein set forth.

[This invention consists, first, in certain improved means of cocking the hammer by the act of closing the breech after loading. It consists, secondly, in an improvement in the shell extractor or device by which discharged metallic cartridge shells are withdrawn from the chamber of the gun and thrown away after such withdrawal.]

41,344.—Reversible Plumb and Square.—Milton V. Nobles, St. Anthony's Falls, Minn., assignor to himself and John C. Nobles:

I claim the arranging of two pendulums or weighted rods in the body of a square, indicating in opposite directions a plumb line, so that the instrument may be used with the arm of the square, up or down, as differing circumstances may require, and as set forth.

41,345.—Corn Planter.—Joseph Olmstead, Knoxville, Ill., assignor to himself and John H. Lewis:

First, I claim the combination and arrangement of the drive wheel, C c, the shaft, E, provided with the pulley, e, the cone pulleys, f g, and shaft, D, operating substantially as and for the purposes specified and described.

Second, I claim the combination of the slide, L, spring valve, J, and lever, I, arranged and operating as herein shown and set forth.

Third, I claim the combination of the shaft, D, arranged as described, the cams, d d, the shaft, F, provided with the arm, h, the spring, s, and lever, I, operating as and for the purposes specified.

Fourth, I claim the arrangement of the markers, N, and springs, O, with the axle, D, for the purpose described and shown.

Fifth, I claim the arrangement of the sliding bar, S, and nut, S′, with the cone pulleys, f g, and belt, a, as and for the purposes specified.]

41,346.—Feed Bag.—W. B. Wait, Greenwood, Mass., assignor to himself and Joseph A. Fairbanks, Melrose, Mass.:

I claim my improved nose-bag or horse-feeder, as made with the ventilating openings, b b b b, in its head cap and with a series of air induction holes or openings, c c c c, arranged in its sides or body, and below the head cap openings, as specified.

I also claim the improved nose-bag or horse-feeder, as made with the head cap, the dependent bag and the supporting annulus, D, so constructed or of such material or materials as to be capable of being folded as circumstances may require, and also, when unfolded, to possess sufficient rigidity to keep the cap properly distended for use on or about the head of a horse or other animal to which it may be applied.

41,347.—Mold for Vulcanizing Rubber, &c.—Henry A. Alden, Matteawan, N. Y., assignor to the New York Rubber Company:

I cla m, first, The method of lining cast-iron molds with type metal or other comparatively soft and fusible metal by the employment, in combination with a pattern and cast-iron mold of a frame constructed to readily adjust and firmly hold the mold in place during the process of forming the lining, at the same time confine the fusible metal, substantially as shown and described.

Second, The construction of the cast-iron mold, so as to allow of the joining surfaces of the mold being cast of soft metal, substantially as set forth and shown.

41,348.—Drying Leather, Paper, &c.—Stephen M. Allen, Woburn, Mass., assignor to Edward Richmond:

I claim the drying of leather-board in heated chambers, so arranged that the hot air may pass up through the same, between and on both sides of the sheets which are held in or attached to frames or supports to set upon their edges at proper distances apart, substantially as herein described.

41,349.—Magnesia Compound.—Christian G. Clemm, Dresden, Germany, assignor to Charles Clemm, Philadelphia, Pa.:

I claim the practical introduction of these chemical processes in the chemical industry in the above-described communication.

41,350.—Mode of Separating the Fibers of Flax, Hemp, &c.—R. T. Shaws, New York City:

I claim the process of treating vegetable fiber for its separation, by lakali and chlorine, substantially as specified.

I also claim moistening vegetable fiber with coal oil or its products previous to the operations of carding, spinning or otherwise manufacturing, for the purposes specified.

41,351.—Making and Coating Pipes, Joints, Bottles, Casks and other Vessels.—Benjamin Rhodes, Bow, Great Britain, assignor to James McGeary, Salem, Mass.:

I claim, first, The mode or method herein described of molding and forming elbows, bends and other hollow vessels, articles and things, by the combination of elastic fabrics with bitumen, bituminous compounds or mastic, as herein set forth.

Second, The mode or method of forming hollow vessels and other articles by means of elastic fabrics in combination with strips of paper, canvas, or other materials and bitumen, bituminous compounds or mastic, for the purpose of combining the layers together and rendering them impervious to water.

Third, The cement used for coating tubes for conveying gas and for other purposes, made substantially of the materials and in the manner set forth.

Fourth, The machinery or apparatus herein described, for making long pipes or tubes.

Fifth, The use of sulphur or brimstone, in combination with any of the materials before named, for the purpose set forth.

Sixth, The mode or method of constructing mandrels or cores for making tubes or pipes, as herein set forth and as illustrated by figures 22, 23 and 24.

Seventh, The application of wire netting, substantially as shown in figure 26, for the purpose of giving additional strength to the connections or joints of pipes and vessels.

41,352.—Retting and Disintegrating Flax, Hemp, &c.—R. T. Shaw, New York City:

I claim the method herein specified, of separating vegetable fiber by boiling in water mixed with my said extract, for the purposes set forth.

RE-ISSUES.

1,605.—Method of Distilling Coal, &c.—John Howarth, Salem, Mass. Patented Sept. 27, 1859:

I claim distilling coal or other carbonaceous substances for the production of oils, gases, vapors, &c., by passing through the material to be acted upon, a current of superheated steam in one body, in a vertical plane, or nearly so, through an upright retort, that is, so that a body of superheated steam shall come in contact with every portion of the said material, as set forth.

I also claim forming oleaginous vapors from coal or other substances yielding pyrogenous oils by passing through the material to be acted upon, air combined with superheated steam, substantially in the manner and for the purposes set forth.

I also claim passing through the material to be acted upon, superheated steam in combination with steam direct from the boiler for the purpose of regulating the temperature, as set forth.

1,606.—Bottle-stopper Fastening.—H. W. Putnam, New York City. Patented March 15, 1859:

I claim, first, Forming the fastener at the part that comes over the cork, of a piece of wire of a U-form, with the ends returned and connected to the bottle, in order that the pressure on the cork or stopper may cause the fastener to hold more securely, as specified.

Second, I claim a wire fastener, for a cork or stopper, in which the ends of the wire are bent nearly at right angles to form the joint or hinge on which the fastener is turned, substantially as specified.

Third, I claim forming the eyes for the reception of the fastener by means of wire bent as set forth.

Fourth, I claim a wire fastener for the stoppers of bottles, fitted so that it can be pressed aside from over the stopper, as set forth, in combination with a band or fastening attaching the same to the neck of the bottle, as specified.

1,607.—Horse Collar and Hame.—Edward Whitney, Albany, N. Y. Patented October 27, 1863:

I claim the metallic shield or plate, C, constructed substantially as and for the purposes herein described and set forth.

I also claim the combination of the metallic shield or plate, C, with the collar, A B, substantially as and for the purposes herein described and set forth.

I also claim the combination of the metallic shield or plate, C, or any equivalent therefor, with the hame, D, in the manner substantially as and for the purposes herein described and set forth.

I also claim, as a whole, the combination of the metallic shield, or its equivalent, the hame, D, and the collar, A B, in the manner and for the purposes substantially as herein described and set forth.

1,608.—Construction of Steam and Sailing Vessels for Naval and Merchant Service.—Augustus Walker, of Buffalo, N. Y. Patented May 23, 1863:

I claim, first, Constructing a vessel with one or more longitudinal arches or truss frames applied in vertical position to the center of the hull, for the purpose of strengthening it, substantially as set forth.

Second, The combination of the central longitudinal truss framing or arch and double concave bottom, constructed substantially as herein described.

Third, The doubly-arched prow or ram, D3, constructed and supported as described.

Fourth, The ventilating tubes, I′ I″, closable by the stanchions, J J, substantially as described.

Fifth, The casing, H, constructed with a circular arch, h, for sustaining the turret, G, substantially as specified.

Sixth, In connection with a vessel of the above construction, I claim the sliding pilot houses, K K, elevated and sustained in any way substantially as described.

Seventh, The described position and means of working the anchors.

[An illustrated description of this invention will shortly appear in our columns.]

DESIGNS.

1,884 to 1,886.—Three patents for Carpet Patterns.—E J. Ney, Lowell, Mass., assignor to the Lowell Manufacturing Company.

1,887.—Stair Rod.—David S. Plume, Newark, N. J.

PATENTS

GRANTED

FOR SEVENTEEN YEARS!

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents:—

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter:

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D. BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F. and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue Address MUNN & CO., No. 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861, are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting or writing to MUNN & CO., No. 37 Park Row, New York.

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REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of ejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATENTS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They think they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does not limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c., may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignments of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the Rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

Back Numbers and Volumes of the "Scientific American."

VOLUMES I., II., IV., V., VII. VIII. AND IX., (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $2 25 per volume, by mail, $3—which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference. Subscribers should not fail to preserve their numbers for binding. VOL. II. and VI. are out of print and cannot be supplied.

Notes and Queries

J. G., of Md.—Your communication is of interest, but you have not stated where the furnace is located, nor where the ore is obtained, although we infer the steamboat you mention runs on Lake Superior. Be particular in describing the places in your next letter.

T. H., of Pa.—The south pole attracts the north pole of a magnet, and *vice versa*. When a small compass, therefore, is brought within the influence of a large and powerful one, the small magnet is rotated.

M. D., of Maine.—The sound of one bugle is heard at as great a distance as fifty pitched on the same key—that is, considering the sounds to proceed from the same center of vibration.

C. D., of Mo.—Fluor spar subjected to the heat of a blow-pipe will emit a phosphorescent light; but we are unacquainted with any cold mixture that will produce such a light in a glass vessel.

E. H. H., of Ohio.—We have no data to ascertain how far a 200-lb. shot would go through water direct. Our iron-clads are armor-plated to a depth of from two to four feet below the light load-line: some are of wood and some are of iron below the armor.

L. F. R., of N. Y.—It is impossible for us to judge from your letter what sort of occupation is best suited to your taste and capacity. We usually think it best for persons seeking employment to do that which suits their own inclination; but for us to undertake to advise what you ought to do would be simply absurd.

G. W. L., of N. Y.—There is no special work published relating to the combustion of our anthracite coal in furnaces.

J. S., of Pa.—Litharge is about the best "drier" for paints that you can use, but the oxide of manganese is scarcely inferior. Fused copal is dissolved in hot oil with turpentine, but we have been informed that varnish makers now employ benzine as a substitute for the turpentine. How it is used we have not been informed, but as it is very volatile it will require to be mixed in a close vessel.

M. M. C., of Maine.—The quantity of waste water at the snifting valve of a hydraulic ram will depend upon the hight of the fall, and the hight to which the water is to be raised. If the water is to be raised to a less hight than the fall, the waste water will be less than that which is forced up by the ram, and *vice versa*. We leave out the question of friction in the pipes. With a fall of four feet to raise water eight feet, double the quantity of water to that elevated will be required.

E. L., of Pa.—We cannot understand the nature of your question. You ask the reason why 30 pounds of soda, dissolved in 40 gallons of water, will not crystallize when half a pint of vitriol is added. We cannot see what purpose you intend to subserve by the use of the vitriol. Caustic soda lye is made by dissolving equal quantities of fresh slacked lime and soda, then allowing the sediment to settle. The clear liquor is caustic soda lye, from which, if oil, tallow or any other grease is added and boiled a sufficient length of time, hard soap will be produced.

W. D., of Ill.—The furnaces under steam boilers, for burning bituminous coal, range from three feet to eighteen inches in depth according to the size of boiler. Your fire-box of 12 inches depth may answer for the small boiler. Anthracite coal is more destructive than bituminous upon boilers.

J. W. P., of Wis.—Your desire to obtain a quick running water wheel to avoid the use of gearing in running your lathe and you have only a fall of four feet. You will be unable to get a quick-running wheel on such a low fall, but any of the turbine wheels advertised in the SCIENTIFIC AMERICAN will suit your purpose best. There is no book published containing illustrations of the most recent improvements in water wheels, but most of the best wheels have been described and illustrated in our columns.

D. McJ., of Canada.—We believe you will find no difficulty in smelting metals in your cupola, five feet in hight and fifteen inches in diameter, by using any good blower to produce a a draft. A six horse-power engine should be sufficient to drive the blower. We advise you not to waste time, labor or money upon a flying machine. Some new power superior to steam must be discovered before flying can be rendered practicable. The British ink powder which you have forwarded appears to be composed of the extract of logwood, some cam wood, a little picric acid and the bichromate of potash. Ink made with nut galls, logwood and the sulphate of iron, is the most permanent known to us for records that are intended to be kept for many years.

G. C., of Conn.—Address the Delamater Iron Works for such information as you require about caloric engines. We cannot state which is the best steam engine of ten horse-power.

Money Received.

At the Scientific American Office, on account of Patent Office business, from Wednesday, Jan. 20, 1864, to Wednesday, Jan. 27, 1864 :—

J. M. M., of N. Y., $12; J. McK., of Iowa, $40; A. F. C., of N. Y., $45; W. K., of N. Y., $20; E. D. W., of N. Y., $51; S. G. W., of Ill., $20; W. B. R., of Mass., $20; A. M. G., of N. H., $41; C. F. T., of N. Y., $61; F. S. D., of Ill., $20; O. A., of N. Y., $20; C. N., of N. Y., $56; P. H., of Pa., $20; R. H. L., of Pa., $44; A. T., of N. Y., $16; T. H. B., of N. Y., $45; C. J. F., of N. J., $16; I. L., of N. Y., $25; T. J. B., of Wis., $25; B. L. M., of Conn., $16; W. C. H., of Ohio, $30; C. W., of Iowa, $12; B. H. & Co., of Ill, $15; A. S. G., of Ill., $20; G. M., of Ill., $25; J. B., of N. Y., $21; C. P., of Mo., $20; G. W. R., of R. I., $10; S. H. M., of Ill., $16; J. J. McC., of Conn., $25; J. S., of Mass., $16; P. C., of Mass., $28; R. W. P., of Mass., $25; E. D., of Maine, $16; J. R., of N. Y., $25; J. N. B., of N. Y., $20; H. H. E., of Conn., $45; H. J., of Conn., $20; E. F. C., of Nebraska, $20; R. R. B., of N. Y., $45; J. R., of Iowa, $20; W. T. E., of N. J., $45; H. W., of N. Y., $16; G. S., of N. Y., $10; F. & P., of N. Y., $16; A. H., of Ill., $45; G. O. W., of Mass., $20; A. M. & J. M. H., of N. Y., $41; G. & S., of N. Y., $45; M. & B., of N. Y., $16; F. A. M., of Pa., $25; G. W. A., of Va., $25; L. D. W., of Mich., $25; S. D. D., of Iowa, $25; B. & H., of N. J., $16; P. & W., of Iowa, $25; F. G., of Mich., $16; E. P., of Ill., $20; B. & P., of N. Y., $10; G. R. V., of N. Y., $10; N. B., of Ill., $20; J. S., of Mo., $25; E. H. M., of Iowa, $16; S. S. H., of Conn., $16; C. & W., of Mass., $10; S. A. H., of Conn., $16; V. D. S., of Iowa, $25; M. T., of Iowa, $50; C. V. W., of N. Y., $20; R. H. R., of N. Y., $16; W. H. M., of Conn., $22; J. B., of Iowa, $45; F. McC., of Conn., $20; H. & B., of N. J., $120; H. M. H., of Pa., $41; F. B., of N. Y., $22; J. M. G., of Ill., $45; A. P., of N. Y., $16; C. W., of Mich., $20; N. P. S., of N. Y., $51; E. P. N., of N. Y., $46; H. A. T., of Ill., $10; A. B. L., of Conn., $15; J. G. F., of Mass., $16; T. C., of Conn., $16; L. S. F., of N. J., $16; D. G., of Pa., $16; H. R., of Wis., $25; T. H., of Iowa, $21; C. K., of Ill., $50; H. & B., of Ill., $50; A. T., of Iowa, $30; J. B. A., of Ill., $16; R. C. G., of Va., $20; V. & L., of Minn., $16; J. L. H. F., of N. J., $16; W. & T., of Conn., $16; D. & S., of Pa., $21; T. & L., of N. J., $25.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office, from Wednesday, Jan. 20, 1864, to Wednesday Jan. 27, 1864 :—

J. M. M., of N. Y.; J. R., of Ill.; J. R., of N. Y.; M. T., of Iowa (2 cases); A. A H., of N. Y.; J. McK., of Iowa; J. N. B., of N. Y.; C. V. W., of N. Y.; A. M. G., of N. H.; C. F. T., of N. Y.; F. B., of N. Y.; N. P. S., of N. Y.; R. H. L., of N. Y.; A. M. & J. M. H., of N. Y.; E. P. N., of N. Y.; E. W., of Iowa; J. J. McC., of Conn.; S. D. D., of Iowa; J. C. C., of Ohio; H. C. C., of Ohio; G. R. V., of N. Y.; P. & W., of Iowa; L. D. W., of Mich.; T. J. B., of Wis.; G. W. A., of Va.; J. J. R., of Ill.; I. L., of N. Y.; F. A. M., of Pa.; B. & P., of Pa.; J. S., of Mo.; N. B., of Ill.; J. G. F., of Mass.; H. R., of Wis.; C. K., of Ill., (2 cases); G. M., of Ill.; J. J. G., of Ohio; R. W. P., of Mass.; V. D. S., of Iowa; T. & L., of N. J.; D. & S., of Pa.; E. H., of Cal.

Binding the "Scientific American."

It is important that all works of reference should be well bound. The SCIENTIFIC AMERICAN being the only publication in the country which records the doings of the United States Patent Office, it is preserved by a large class of its patrons, lawyers and others, for reference. Some complaints have been made that our past mode of binding in cloth is not serviceable, and a wish has been expressed that we would adopt the style of binding used on the old series, *i. e.*, heavy board sides covered with marble paper, and morocco backs and corners.

Believing that the latter style of binding will better please a large portion of our readers, we commenced on the expiration of Volume VII., to bind the sheets sent to us for the purpose in heavy board sides, covered with marble paper and leather backs and corners.

The price of binding in the above style is 75 cents. We shall be unable hereafter to furnish covers to the trade, but will be happy to receive orders for binding at the publication office, No. 37 Park Row, New York.

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The publishers of the SCIENTIFIC AMERICAN have just prepared with much care, a pamphlet of information about Patents and the Patent Laws, which ought to be in the hands of every inventor and patentee, and also of manufacturers who use patented inventions. The character of this useful work will be better understood after reading the following synopsis of its contents :—

The complete Patent Law Amendment Act of 1861—Practical Instructions to Inventors, how to obtain Letters Patent, also about Models—Designs—Caveats—Trade-marks—Assignments—Revenue Tax—Extensions—Interferences—Infringements—Appeals—Re-issues of Defective Patents—Validity of Patents—Abandonment of Inventions—Best Mode of Introducing them—Importance of the Specification—Who are entitled to Patents—What will prevent the granting of a Patent—Patents in Canada and European Patents—Schedule of Patent Fees; also a variety of miscellaneous items on patent law questions.

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SALE OF CONDEMNED NAVY CANNON.

BUREAU OF ORDNANCE, NAVY DEPARTMENT,
WASHINGTON CITY, Jan. 18, 1864.

Notice is hereby given that on the 15th day of February next, at 12 o'clock M., there will be sold at public auction, at the Navy Yard, Brooklyn, N. Y., and at the Navy Yard, Portsmouth, N. H., the following cannon, being 32-pounders of 61 cwt., known as "gradual increase," viz:—

One hundred and six (106) cannon at Navy Yard, Brooklyn.

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These guns are to be sold by the pound, and one-half the purchase-money is to be paid at the completion of the sale, and the other half upon the removal of the guns by the purchaser, which removal must take place within ten days after the sale, and at the expense of said purchaser. H. A. WISE, Chief of Bureau.

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PROPOSALS FOR BLANKETS.

ORDNANCE OFFICE, WAR DEPARTMENT,
Washington, January 12, 1864.

SEALED PROPOSALS will be received at this office until 4 o'clock P.M., on the 30th January, 1864, for the delivery at the New York Agency, No. 45 Worth street, of the following Blankets, viz:

60,000 Regulation Cavalry Blankets, Prussian blue or Gentian dyed.

20,000 Regulation Artillery Blankets.

These Blankets must be of pure wool, close woven, of stout yarns.

FOR THE CAVALRY.

Blue, with an orange border three inches wide, and three inches from the edge, and the letters "U. S," six inches high, orange color, in the center of the blanket.

FOR THE ARTILLERY.

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All the Blankets are to be 75 inches long by 67 inches wide, and of the weight of 3,1875 lbs., or say 3 3-16 lbs., on which a variation of 0,1875, or 3-16ths of a lb. may be allowed. They must be single and not in pairs, and packed in cases of one hundred each. The value of the cases to be paid for at a price to be determined by the Inspector.

The Blankets are to be inspected at the factory where made, and none will be accepted or paid for but such as are approved on inspection.

Deliveries must be made as follows: One-tenth of the amount contracted for, per week, commencing within one month from the date of the contract.

Failure to deliver at a specified time will subject the contractor to a forfeiture of the quantity due at that time.

No bid will be considered which does not come from a manufacturer of blankets or regular dealer in such goods.

Bids will be considered for the delivery of the blankets at the factory, as well as at the agency above mentioned.

Each bid is to be accompanied by the names of the sureties of the proposal.

Each party obtaining a contract will be required to enter into bonds with approved sureties for the faithful execution of the same.

Upon the award being made, successful bidders will be notified and furnished with forms of contract and bond.

The Department reserves the right to reject any, or all the bids, if deemed unsatisfactory on any account.

Proposals will be addressed to "Brigadier-General George D. Ramsay, Chief of Ordnance, Washington City," and will be endorsed "Proposals for Blankets."

GEORGE D. RAMSAY,
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DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C., Dec. 15, 1863.

To the Growers and Manufacturers of Flax and Hemp:

THE COMMISSIONERS APPOINTED BY THIS DEPARTMENT, consisting of Hon. J. K. Morehead, of Pennsylvania, William M. Bailey, of Rhode Island, and John A Warder, of Ohio, to consider the following appropriation made by the last Congress, viz.:

"For investigations to test the practicability of cultivating and preparing flax and hemp as a substitute for cotton, twenty thousand dollars."

Having met, and after several days' investigation, believing that a further and fuller notice of their investigations might produce valuable results, adjourned to meet again on Wednesday the 24th day of February next, at 12 o'clock, M.

They request all interested in the distribution of this appropriation, or anxious to develop the subject for the public good, to send to this Department, on or before that day, samples of the hemp and flax in the different stages of preparation; of the fibers and fabrics prepared by them, accompanied by statements of the various processes used, and the cost of production in each case; also, descriptions of the kind and cost of machinery used, where made, &c., together with any and all information that may be useful to the Commission.

This information is necessary before an intelligent distribution of the appropriation can be made. ISAAC NEWTON.

1 9 Commissioner.

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No charge is made for the publication, and the cuts are furnished to the party for whom they are executed as soon as they have been used. We wish it understood, however, that no second-hand or poor engravings, such as patentees often get executed by inexperienced artists for printing circulars and handbills from, can be admitted into these pages. We also reserve the right to accept or reject such subjects as are presented for publication. And it is not our desire to receive orders for engraving and publishing any but good Inventions or Machines, and such as do not meet our approbation in this respect, we shall decline to publish.

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Improved Steam Boiler.

The steam boiler herewith shown in section represents an improved method of constructing generators of this class, so as to obtain the greatest benefit from the fuel. By the arrangement of the heating surfaces with reference to the grate or fire-bar area, a large amount of surface is secured for evaporating water. The construction of the boiler is simple and has merit.

The plan is simply to insert a cylinder boiler, A, filled with tubes, B—of any desired area (see Figs. 1 and 2), but not so small that the circulation of the water will be impeded, or the boiler rendered liable to foam—in another boiler or water jacket, C. In the lower part of this jacket the furnace, D, is set. The water-jacket is further surmounted with a dome or cylinder, which is connected to it by short tubes, E. At the front end of the boiler the usual breeching or up-take is attached, through which all the products of combustion find their way to the air. There is also a man-hole, F, and space, G, by which access may be had to the inside of the boiler. The operation of this boiler and the course of the flame and heat is shown by the arrows; from the furnace the caloric rises hrough the passages, H, and completely surrounds he internal cylinder, and passing through the small tubes, is taken up or arrested by them, so that when it reaches the chimney it has comparatively little value as an evaporating agent. The drum or cylinder above the main boiler is also partially filled with water, and it is in this that the gage-cocks are set; when water is shown at this point there is a moral certainty that there is no lack below in the vital parts. Steam is taken from the drum as usual, and the safety valve and their fixtures are also placed there. This boiler would make an excellent one for factories or saw-mills where timber is worked; as slabs, shavings and other odds and ends of refuse wood could be burnt to great advantage.

This boiler was patented by R. S. Harris of Dubuque, Iowa, on Dec. 15, 1863, through the Scientific American Patent Agency. For further information address the inventor as above.

Fig. 1.

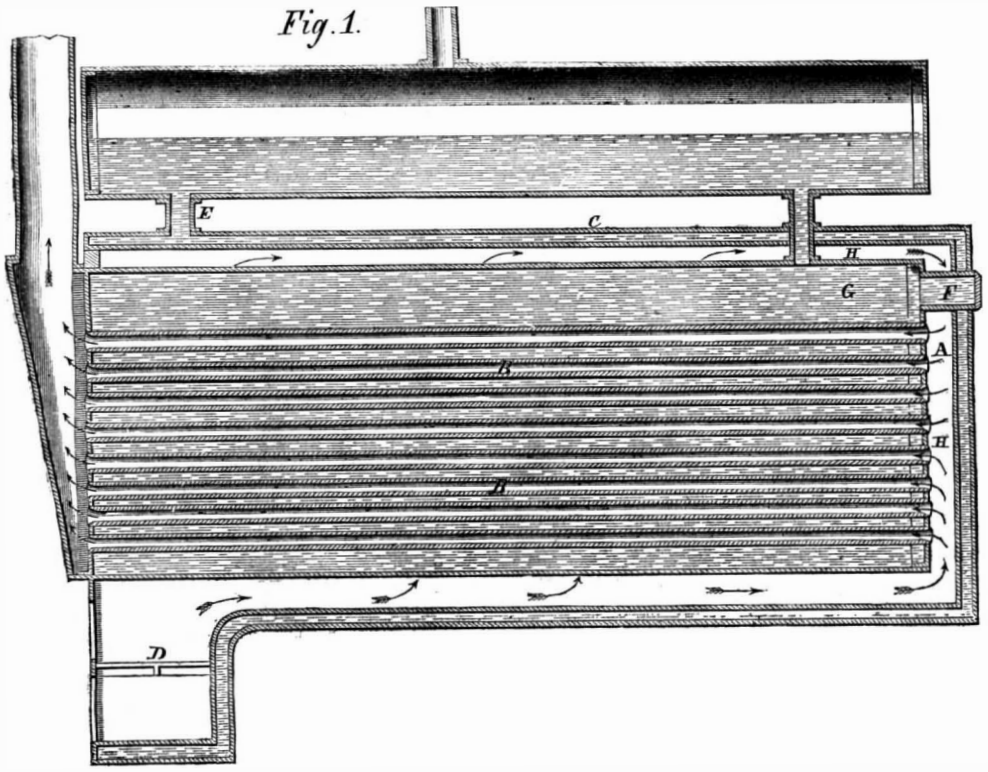
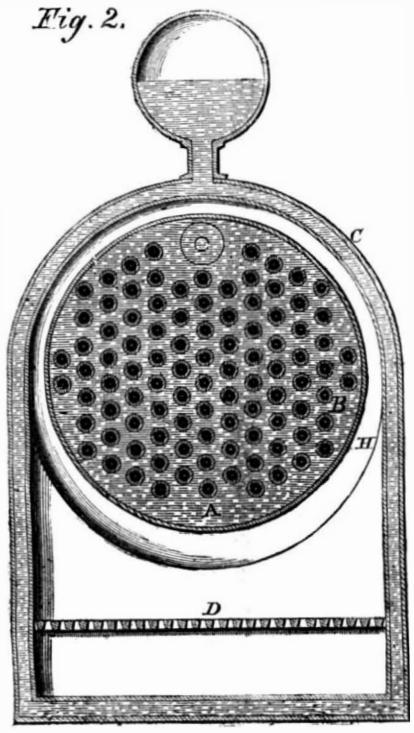


Fig. 2.



HARRIS'S IMPROVED STEAM BOILER.

An "Opium Hell" in Java.

What spirituous liquors are for the European, opium is in Java for the Mahomedan and Chinaman. A European of the lower classes may sit in his tap-room and debase himself by his sottishness; but he does it with an uproarious merriment which would make one think he was really happy, spite of the headaches and delirium tremens he may know are in store for him. But in an opium hell all is as still as the grave. A murky lamp spreads a flickering light through the low-roofed suffocating room in which are placed bale-bales, or rough wooden tables, covered with coarse matting, and divided into compartments by means of bamboo-reed wainscotting. The opium smokers—men and women—lost to every sense of modesty, throw themselves languidly on the matting, and, their heads supported by a greasy cushion, prepare to indulge in their darling vice. A smallburning lamp is placed on the table, so as to be easily reached by all the degraded wretches who seek forgetfulness or elysium in the fumes of opium. A pipe of bamboo-reed, with a bowl at one end to contain the opium, is generally made to do service to two smokers. A piece of opium about the size of a pea costs sixpence (a day's wages); but it is sufficient to lull by its fumes the sense of the smoker. These fumes they inhale deliberately, retaining them in the mouth as long as they can, and then allowing them gradually to exhale through the nostrils. After two or three inhalations, however, the opium is consumed and the pipe falls from the hands of its victim. At first the smokers talk to each other in a whisper scarcely audible, but they soon become still as the dead. Their dull sunken eyes gradually becoming bright and sparkling; their hollow cheeks seem to assume a healthy roundness; a gleam of satisfaction—nay, of ecstacy—lightens up their countenances as they revel in imagination in those sensual delights which are to constitute their Mahomedan paradise. Enervated, languid, emaciated as they are, in fact, they seem and feel for the time regenerated; and though they lie there, the shameless and impassive slaves of sensuality and lust, their senses are evidently steeped in bliss. Aroused, however, from their dreams and delusions, the potency of the charm exhausted—driven from their hell by its proprietor—see them next morning walking with faltering step, eyes dull as lead, cheeks hollow as coffins, to their work.

VALUE OF SCRAP IRON.—At the sale in Virginia, of nearly 2,000 tuns of wrought and cast scrap iron, eight worn-out locomotives brought prices ranging from sixteen hundred to twenty-five hundred dollars each. Old car wheels sold for forty-five dollars and a half per tun. Car axles, seventy-five dollars per tun. Wrought iron scraps fifty-five dollars per tun. Old steel springs, one hundred and twenty-seven dollars per tun. Old nails, sixty-one dollars per tun. Cast scrap iron, thirty-seven dollars per tun. A large number of iron dealers from New York, Pennsylvania and other States were present. The "ring" formed to keep down the prices was broken by the competition of the bidders.

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FOR 1864!

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